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WATTLES AND WATTLE-BARKS.

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HINTS ON THE CONSERVATION AND CULTIVATION OF WATTLES

TOGETHER WITH PARTICULARS OF THEIR VALUE

(WITH A BOTANICAL APPENDIX CONCERNING NEW SOUTH WALES SPECIES).

BY

J. H. MAIDEN, F.L.S.,

GOVERNMENT BOTANIST AND DIRECTOR OF THE BOTANIC GARDENS, SYDNEY;
FORMERLY CURATOR OF THE TECHNOLOGICAL MUSEUM, SYDNEY;
AUTHOR OF "THE USEFUL NATIVE PLANTS OF AUSTRALIA"; "THE FOREST FLORA OF NEW SOUTH WALES"; "A CRITICAL REVISION OF THE GENUS EUCALYPTUS,"
&c., &c., &c.

WITH ELEVEN ILLUSTRATIONS.

THIRD EDITION.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1906.

[1s. 6d.]

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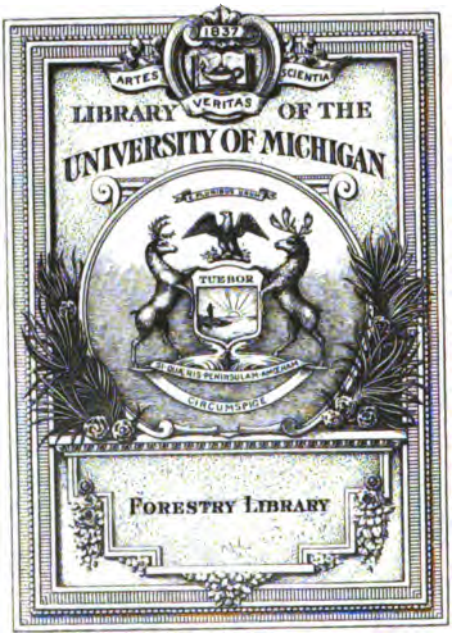
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WATTLES AND WATTLE-BARKS,

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BEING

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DEDICATION.

(By Permission.)

Wattles do most, of all plants, to decorate this sunny land with beautiful flowers. I think it appropriate to dedicate this little work to the Hon. J. H. Carruthers, now Premier of New South Wales, who is an ardent horticulturist, specially cultivating native plants. He has been specially interested in the subject of this work for nearly twenty years.

J.H.M.

11th May, 1906.

Forestry Library
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INTRODUCTORY.

(To First Edition, pp. 41, with 7 Plates.)

THIS little work is the practical outcome of many years of research and observation in the subject matter on the part of the Curator of the Technological Museum, Sydney. It has been prepared and is being published at the present time at the request of the Department of Public Instruction, which has recently assumed the direct control of Technical Education in this Colony. It is hoped that the information sought to be diffused will direct attention to, and will stir enterprise in, the cultivation of the more valuable wattles. The experiments in wattle culture in Victoria and South Australia have resulted in practical success, and in the latter Colony the industry is being carried on with increasing vigour as a profitable pursuit. There is no sound reason why similar good results should not be achieved in New South Wales, which has in many parts both soil and climate well adapted for this special culture. Success in this industry means a vast increase in productive wealth to the Colony, and in view of that fact I feel that the public should receive the full benefit of whatever information may be in the possession of this Department.

J. H. CARRUTHERS,

Minister for Public Instruction.

30 *May*, 1890.

PREFACE TO THE SECOND EDITION.

(PP. 79, WITH 10 PLATES.)

THIS pamphlet is issued to supply farmers, tanners, merchants, and others, with authentic information in regard to the value of wattles. The demand for good wattle bark becomes greater every year, while the supply does not cope with it. The cultivation of wattles is not a theoretical matter; it is easy, remunerative, and has already entered the domain of practical farming. Australia is the native country of wattles; they will grow in the poorest soil, and some require only a moderate rainfall. Their cultivation is strongly recommended to farmers who have a patch of poor soil which they cannot otherwise profitably utilize. The return is in about five to seven years, and attention to the wattle plantation can be chiefly given in the spare hours which are available on every farm. Farmers in some districts could be recommended to put as much land as possible under wattle, provided they had the means to wait. At present only the following wattles are recommended to be planted:—

The South Australian Broad-leaf Wattle, *Acacia pycnantha*, and the various varieties of *Acacia decurrens*, generally known as Black or Green Wattle.

At the same time, reference to the detailed information given in regard to other wattles will show that many of them are worthy of conservation if farmers have them on their land, and further experience may show that some are even worthy of local cultivation. The wattles specially mentioned, however, with their extended geographical range and proved value, are sufficient for all practical purposes at present.

The First Edition of 2,000 copies was applied for in less than six months, not only by residents of every Australian Colony and New Zealand, but by correspondents in many parts of the world, especially European tanners and American extract makers.

The present edition is practically a new work, and will be found to contain a mass of information in regard to the utilization of wattles which has never before been got together. This result has only been possible on account of the abundance of material I have obtained and worked at during the past season, and the generous co-operation of persons engaged in various branches of the industry.

I desire to express my obligations to Mr. R. T. Baker, Assistant Curator, and to Mr. H. G. Smith, Laboratory Assistant, for valuable help.

J.H.M.

Technological Museum,
Sydney, April, 1891.

PREFACE TO THE THIRD EDITION.

MY little work has been out of print for a number of years. I have received hundreds of inquiries for it, not only from Australia and New Zealand, but also from South Africa, the United States, and other parts of the world, and am therefore in a position to say that there is a demand for information on the subject of which it treats.

A good deal of it has been re-written, particularly Part 3, which treats of the New South Wales species of wattles. The genus *Acacia* is second only in importance in Australia to that of *Eucalyptus*, and much work requires to be done in regard to the recognition and distribution of species. Twigs in flower or fruit (pod) will be named if sent to me.

J. H. MAIDEN.

Botanic Gardens,
Sydney, 9 *February*, 1906.

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WATTLES AND WATTLE-BARKS.

PART I.

Demand and Supply.

As regards the importance of a supply of wattle bark to European manufacturers, and the remote possibility of the market being over-supplied, I quote the following, by a correspondent of Mr. J. E. Brown, when Conservator of Forests of South Australia :—" The matter of supply and demand can be compressed into small compass. British and Continental tanners are languishing for ample and continuous supply, and South Australia exports in such driblets that very many of the large firms in Great Britain have given over using it, falling back on Valonia, and other barks more *fully* and *regularly* supplied. I may be allowed to remark here, reliable leather cannot be produced by intermittent and inadequate supply of bark, on which the tanner relies when laying down his hides ; indeed, in large yards, such as with 50,000 hides always in the pits, it becomes a very serious difficulty, attended with anxiety and loss, not to be able, through want of sufficiency of bark of a class, to work them through successfully. It therefore becomes a matter of necessity that the exports of bark may be abundant and regular to such an extent as tanners may confidently rely on. To such low export of wattle-bark have your growers now arrived at, that *one yard* could manage to take fully *one-fourth*—say 1,000 tons—of all the bark shipped from your ports to England in 1882, and about one-third of the shipments for 1883. . . I am aware French and German tanners highly approve of the wattle for tanning purposes." (*Report to S.A. Legislative Council*, 1884.) I believe these remarks still hold good.

Throughout Australia the species of wattle richest in tannic acid are becoming seriously diminished, and there is a consensus of opinion amongst persons interested in the matter that the various Governments should encourage the replanting of them. At the same time, there are some species which tanners despise (partly because the introduction of them would disturb the routine of their operations), which are even richer than some of the tan-barks in common use in Europe and elsewhere, and there is no doubt that, sooner or later, our local tanners will have to fall back upon these second-grade wattle-barks, unless the cultivation of good wattles be actively entered upon.

In regard to Tasmania, which has hitherto supplied so large a quantity of good wattle-bark, Mr. F. Abbott, Superintendent of the Botanical Gardens, Hobart, says :—" We have so many wattle-trees growing naturally, that we have had no need to cultivate them in Tasmania, but the destruction is so great we shall have to do it before long." (*Acacia decurrens*).

Mr. F. Donovan, representative of the Tanners and Curriers' Union of Melbourne, in giving evidence before the Royal Commission on Vegetable Products, states that for the bark which in 1872 cost £3 15s. per ton, £8 or

£9 was paid in 1887, and he is very emphatic on the necessity of wattle culture on a large scale. Mr. Dunn, a tanner, gave evidence to the effect that in 1872 wattle-bark was selling from £2 10s. to £3 a ton. In 1879 the price had gone up as high as £9 10s., and since then it has varied from £8 10s. to £11; in 1887, the best bark was £10. (*Acacia decurrens.*)

The best Sydney black or green wattle-bark (*Acacia decurrens*) fetched £10 in 1890.

The present market rates for New South Wales samples of wattle-bark are :—

Best chopped (chiefly South Coast)	£8 0 0 per ton.
Fair to good (chiefly South Coast, light)	£6 10 0 „
Fair inland	£5 0 0 „
Inferior (Northern Rivers and stringy samples)	£1 10 0 to £4 0 0 „

I am indebted to Mr. W. H. Hall, Acting Government Statistician, Sydney, for the following figures :—

WATTLE BARK—Imports into, and Exports from, the Commonwealth, 1890–1904.

Year.	State.					
	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.
	IMPORTS—QUANTITY.					
	tons.	tons.	tons.	tons.	tons.	tons.
1890	3,061	2,237	1,831	.....	.....	.....
1891	3,708	2,130	1,989	.....	.....	.....
1892	2,830	200	1,566	.....	.....	.....
1893	4,132	275	2,018	.....	.....	.....
1894	3,729	238	2,051	.....	.....	.....
1895	4,038	1,382	2,012	.....	.....	.....
1896	4,677	766	1,902	.....	.....	.....
1897	2,216	558	1,785	.....	.....	.....
1898	3,132	698	2,544	.....	.....	.....
1899	4,035	836	2,445	.....	.....	.....
1900	3,943	2,518	1,944	.....	.....	.....
1901	4,765	1,793	1,964	.....	1	.....
1902	6,413	2,133	1,576	.....	.....	.....
1903	3,772	1,900	1,395	3	355	.....
1904	4,552	4,015	1,483	21	148	2
	EXPORTS—QUANTITY.					
1890	1,789	5,659	128	4,444	.....	11,008
1891	1,825	7,987	68	3,284	.....	7,953
1892	789	4,027	25	3,039	.....	5,177
1893	932	3,283	1	3,152	.....	5,817
1894	1,708	3,161	3	5,132	.....	5,365
1895	2,382	3,808	1	7,157	.....	6,167
1896	2,184	2,359	.....	7,331	.....	5,328
1897	556	2,952	1	5,704	.....	5,105
1898	835	2,620	12	8,206	.....	5,692
1899	372	3,097	1	8,953	.....	5,187
1900	463	1,560	.....	8,386	.....	4,742
1901	29	2,581	15	7,974	.....	4,983
1902	184	3,896	15	7,702	.....	5,765
1903	382	3,477	177	6,669	138	4,618
1904	379	5,122	715	7,205	5,059	4,301

WATTLE BARK—Imports, &c.—*continued.*

Year.	State.					
	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.
			IMPORTS—VALUE.			
	£	£	£	£	£	£
1890	24,610	19,755	12,921	.....	.....	.....
1891	28,162	16,050	13,481	.....	.....	.....
1892	21,688	1,920	9,188	.....	.....	.....
1893	17,839	1,820	11,330	.....	.....	.....
1894	19,491	1,316	13,904	.....	.....	.....
1895	19,634	7,796	11,232	.....	.....	.....
1896	23,285	4,499	11,663	.....	.....	.....
1897	11,010	3,330	9,990	.....	.....	.....
1898	15,554	4,484	16,149	.....	.....	.....
1899	28,245	5,408	18,467	.....	.....	.....
1900	28,728	19,743	15,806	.....	.....	.....
1901	38,417	13,927	18,014	.....	5	.....
1902	53,921	16,509	14,823	.....	.....	.....
1903	33,578	14,880	13,250	22	3,556	.....
1904	31,129	30,915	13,336	146	1,322	44
			EXPORTS—VALUE.			
1890	10,657	60,411	685	56,006	148	87,137
1891	13,056	84,132	397	40,090	1,561	64,230
1892	3,761	38,883	91	34,244	.....	38,212
1893	5,332	27,627	6	28,720	.....	39,166
1894	9,700	22,241	11	40,632	.....	32,039
1895	13,856	23,059	7	48,781	.....	33,753
1896	11,375	17,046	.....	51,682	.....	28,429
1897	3,115	17,693	12	39,665	.....	26,429
1898	3,305	17,478	59	62,132	.....	31,017
1899	2,040	22,772	5	69,985	.....	13,042
1900	2,983	11,688	.....	63,732	.....	29,405
1901	211	20,966	300	67,601	.....	32,773
1902	1,111	32,907	98	68,856	.....	40,190
1903	2,812	28,576	661	65,062	859	32,843
1904	3,194	41,316	2,685	59,902	32,876	30,706

These figures are interesting.

South Australia (with her fine *pycnantha* bark) and Tasmania (with her fine *decurrens* var. *mollis* bark) practically import no wattle-bark. South Australia's exports in 1890 were 4,444 tons, valued at £56,006, say £13 a ton. In 1904 they had risen to 7,205 tons, valued at £59,902, but the price had fallen to rather more than £8 per ton.

Dealing with the exports of the three *decurrens* States, we have—

State.	1890.		1904.	
	Weight.	Value per Ton.	Weight.	Value per Ton.
Tasmania	11,008 tons	Little under £8	4,301 tons	Shade over £7.
Victoria	5,659 „	£10 14s. 0d.	5,122 „	£8.
N. S. Wales	1,789 „	£6 (shade under)	379 „	£8.

Tasmania has therefore lost ground severely in the quantity, and nearly £1 in the price per ton. Victoria has maintained her quantity, but has lost £2 14s. per ton. New South Wales has nearly lost her export trade, but has gained £2 perton.

I am not able to explain these figures entirely to my own satisfaction. The differences of the Customs arrangements in the various States prior to 1901, may have had something to do with it; the competition of Natal must certainly be a factor.

I think that the figures are eloquent that the wattle-bark industry has made no progress, and the welfare of the industry is inseparably bound up with that of the leather industry.

Wattle-bark in Natal.

Since the previous editions of the present work were issued, Natal has come forward as a strong competitor with Australia in regard to wattle-bark. Messrs. Sutton's, Fairchild's, and Sim's works on Natal wattle-bark are referred to in the Bibliography, p. 33.

Compare the above figures (pp. 2 and 3) with the exports of wattle-bark from Natal (according to senders' Customs returns.)—(T. R. Sim, p. 127) :—

			Value. £
1886	39	packages	11
1887	449	„	315
1888	864	„	410
1889	4,623	„	2,783
1890	7,911	„	3,389
1891	13,972	„	5,588
1892	19,408	„	9,234
1893	22,976	„	9,304
1894	40,485	„	12,569
1895	57,666	„	17,209
1896	3,378	tons	16,450
1897	4,098	„	17,659
1898	9,427	„	30,929
1899	11,070	„	57,885
1900	8,900	„	46,479
1901	13,771	„	69,850
1902	15,537	„	74,554
1903	12,135	„ and 168,767 bags	70,581

Total, 168,393 packages up till 1895; 78,316 tons and 168,767 bags during 1896-1903; or, approximately, 100,000 tons altogether, valued at £445,199.

These figures show a tremendous and well maintained expansion, partly the result of a boom which occurred after shipments began to sell in Europe, and partly steady increase since then, which still continues, if it has not again actually reached a boom condition, and which must continue when recent planting comes into bearing. Several strong companies have from time to time been formed; the Town Hill Wattle Company, and Messrs. Angus & Co., both old companies, having over 3,000 acres each, more or less in fit condition for felling now, while several newer companies are laying down plantations at the rate of up to 1,000 acres each a year.

Mr. T. R. Sim begins his chapter on the "Black Wattle Industry" in the following words :—

Natal is the fortunate possessor in the culture of black-wattle, of an industry unique in many respects. Among these may be mentioned :—

(1) Wherever it exists it is the only timber industry giving a full return within a few years, and keeping that up in perpetuity.

(2) It is an industry in a foreign tree whose cultivation in its native land was neglected until the possibilities of the industry were demonstrated in Natal.

(3) Though the industry is only twenty years old, wattle-bark is one of the most important over-sea exports Natal has, its value having now reached over £70,000 per annum, and is rapidly increasing.

(4) Among timber cultures it is the only one which yields a high rate of interest on capital invested, and that even without expert management.

(5) It has given a high value to certain soils unsuited for ordinary cultivation, and has raised the general land values in the wattle districts as much as if a town had sprung into existence in the neighbourhood.

(6) It has made steady progress, and there is every prospect that it will continue to do so. At present there are over 30,000 acres in Natal under black wattle.

Mr. Sims is entitled to be jubilant at the very great success which his colony has attained in this industry.

In 1904 circulars were issued by our Department of Lands couched in the following terms :—

"I am directed by the honorable the Minister for Lands to request that you will be good enough to state whether you are aware of any failure or diminishment in the supply of New South Wales wattle-bark, such as might be evidenced by a marked increase of price, and, if so, will you kindly favour this Department with any suggestions you may have to offer in the direction of restoring the quality or quantity of this peculiarly Australian raw product.

"This inquiry, I may state is instituted, in consequence of an intimation received from a correspondent at Cape Town, South Africa, who alleges that inquiries have been made there by Australian tanners for wattle-bark grown in Natal by private enterprise from seed of the indigenous species *Acacia decurrens*, which was originally obtained from this State"

Some valuable information has been received in response to this circular.

During the past year attention was drawn to the matter by Mr. Valder, and in April last the following paragraph appeared in most of the Sydney newspapers :—

"A remarkable instance of the profitable results attending the cultivation of wattle-trees for the purpose of utilising their bark for tanning purposes, is furnished in a report received by the Government from Mr. Valder, N.S.W. Commercial Agent in South Africa. Twenty years ago wattle-trees did not exist in Natal. A large number of seedlings were imported from Australia, and to-day the export of wattle-bark is one of the most profitable industries of Natal. Last year 15,819 tons valued at £92,911, were exported from Natal, as against 12,135 tons, valued at £70,581, sent away in 1903. This result has been obtained from cultivated lands. In the course of his report, Mr. Valder remarks :—

"The exporters have to pay a freight (this freight was 20s. per ton up to quite recently, it is now 25s. per ton, J.H.M.), from Durban to London, which is quite as heavy as that from Sydney to London, and from inquiries made I feel certain that the cost of production would be less in New South Wales than it is in Natal. The farmers in Natal state that besides being a profitable crop, the wattle has proved to be remarkably useful for the formation of shelter belts for cattle in districts which, prior to the introduction of this tree, were practically treeless. Mr. T. R. Sim, the Natal Conservator of Forests, says :—

'Wherever it exists, it is the only timber industry giving a full return within a few years, and keeping that up in perpetuity. It is an industry in a foreign tree whose cultivation in its native land was neglected, until the possibilities of the industry were demonstrated in Natal. Among timber cultures it is the only one which yields a high rate of interest on capital invested, and that even without expert management. It has given a high value to certain soils unsuited for ordinary cultivation, and has raised the general land values in the wattle districts, as much as if a town had sprung into existence in the neighbourhood.' "

Commenting on this, an influential Sydney newspaper headed an article "A bad miss for New South Wales," and went on to say, "Most people who know anything of the facts must have blushed with shame when they read what Mr. Valder, the N.S.W. Commercial Agent in Africa, had to say of the wattle-bark industry in Natal."

Personally I have no doubt we ought to blush for this as for other matters of omission, but the matter is hardly as simple as it looks. Like other things in this world it has another side.

Mr. Valder, in his statement, endorses the remarks of Mr. T. R. Sim, the Natal Conservator of Forests, already quoted by me.

About the time of Mr. Valder's report we had the pleasure of a visit from the Chairman of the Land Board in Natal, and I discussed the subject of wattle-growing with him.

In the first place the wattle industry in Natal is done by indentured Indian coolies, whose cost is two shillings per day. Native labour is also utilised. Their hours are long, the cost is as I have stated, and Australia does not seem keen to allow coloured labour within her territories. I dare say that we could do more than we do with wattles, given a large supply of cheap Indian coolie labour.

Then again, all the Natal-grown wattle is cultivated,—in Australia most of it is uncultivated. The consequence is the Natal crop is compact and under control, and the practical value of this is well known to every cultivator. Very few "wild" crops in the world can compete with cultivated crops of the same article. Where the trees are unplanted the crop is more or less uncertain, and often large distances have to be traversed to obtain the product.

Another thing to be borne in mind is that a plant frequently grows more vigorously in a foreign country than it does in its own. Instances of this are the vigour with which certain imported weeds grow in Australia. The rapidity of growth of *Eucalyptus globulus* in New Zealand and California may, perhaps, be cited.

In any case, the rapidity of growth of the Australian wattle in the upland grass-lands of Natal, is worthy of note. These lands are already treeless, so there is no expense for clearing.

What New South Wales may do.

What Natal has done, I do not doubt can be profitably repeated in New South Wales in another way. We have been so bountifully supplied by nature with wattle-areas and timber lands, that it rarely occurs to us to plant or conserve them on scientific principles. I do not think we are in a parlous state just yet, but the way in which attempts to place forestry matters on a sound basis are persistently resisted by outsiders, augurs badly for the future. As a prominent South African recently said to me, "Through unrestricted competition you are selling your timber at a ridiculous price," and the time will come when it will be realised that our national forests are not the sole property of the persons who exploit them, and the people immediately dependent on the industry, but belong to the people of the State at large. That the wattle-bark industry of New South Wales should be dealt with more stringently by regulation or enactment, I have no doubt.

In 1890, Mr. C. A. Baddeley, of Moruya, wrote as follows to the *Sydney Morning Herald*, of 4th July, 1890 :—

" . . . . I allude more particularly to the destruction that takes place upon Government reserves and Crown lands. Any person by paying a fee of 10s. for the former, and 5s. for the latter, monthly in each case, can obtain a license to strip bark, the condition being that for one particular species the girth or gauge shall be 4 inches thick at 2 feet from the ground, and for another 5 inches at the same distance. Is it then any wonder that considering the ridiculously small girth allowed to be stripped that all the marketable

bark in this southern portion of the Colony has totally disappeared, and, as a natural consequence, the markets are now supplied with large quantities of a most inferior article, caused only by the trees not being allowed time to attain a proper size or growth? As I said before is it any wonder that our forests are being denuded of this very valuable tree? I have spoken repeatedly to forest rangers and others, but they all agree in being powerless to act where the trees stripped are in accordance with the gauge required by regulation. Persons holding licenses will readily admit that it is a pity to strip the trees while so young. 'But what can we do? If I do not strip them someone else will.' In this, the Twofold Bay District—and which, I believe, is the greatest bark-producing district in the Colony—no good marketable bark can now be found anywhere upon Crown lands.

"The good bark is raised in paddocks, the trees are carefully trimmed and well looked after, and allowed to mature before stripping, consequently it must be apparent to the most casual observer, the immense loss to the Colony entailed by the destruction I have mentioned; and I venture to think that a very simple remedy might be adopted to prevent further havoc, and that is the leasing of certain areas for the purpose of wattle cultivation, viz., all lands within population boundaries, timber, water, and camping reserves, in short all proclaimed areas. Lease the right to cultivate and conserve wattle only, and this would in no way interfere with any commonage right the public may have in such reserves. The same can also be said of timber and water. Simply lease the land for a special purpose, viz., to cultivate wattle, and in each case let the Land Board determine the assessment in accordance with the condition, situation, or producing capabilities of each lease applied for. No survey would be needed, as natural features of the country would be near enough and sufficient in determining boundaries. I feel satisfied that by the adoption of the methods suggested thousands of acres would be taken up, and the lessee, being secured in his tenure of the land, would be in a position to give employment, and cultivate wattle in a systematic and practical manner, and thus the Colony would be directly benefited by the production of first-class bark."

If we turn to the "Guide to the Timber and Quarry Regulations," issued by the Forest Department, Sydney, we find that—

"Any person desiring to obtain timber, stone, or other material from Crown lands, whether vacant or held under lease or license, must hold, whilst operating thereon, a license or a permit, as respectively defined in the Regulations.

"A license or permit is an authority from the Crown, which entitles the holder, for a certain period, to enter upon defined land, and to obtain therefrom, subject to stated conditions, the material denoted, but does not convey any further right or authority."

The fee for a tan-bark license is 20s. per month. The regulations referring to the same are Nos. 24-30, and are given herewith:—

Licenses to strip and remove Wattle and other bark for Tanning Purposes.

24. A tan-bark license shall entitle the holder to strip and remove bark from the black or feather leaf, or from the golden or broad leaf species of wattle-trees of girth not less than that prescribed by Regulation No. 27, or the bark of such other trees as the Minister may permit, by notice in the Gazette, to be stripped for tanning purposes, on or from any Crown land not exempted by Regulation or by notice in the Gazette from the operation of such license. Tan-bark licenses may be obtained on application to a Crown Lands Agent or Clerk of Petty Sessions, or other person duly authorised to issue such license, or to the Department of Lands, Sydney. A tan-bark license may be issued for one month, or any number of months not exceeding twelve months, and the fee for such a license shall be £1 per month, but the Minister may authorise such licenses to be issued at a fee of 10s. per month for the stripping of any description of bark for tanning purposes, other than that from the black or feather leaf, or the golden or broad leaf species of wattle.

25. A tan-bark license must be held by each person stripping or removing wattle or the bark of other authorised trees for tanning purposes on Crown lands; such license must be produced upon the demand of any Forest Officer, Crown Lands Bailiff, Police Officer, or other authorised person.

Provisions.

26. A tan-bark license shall take effect from such date as may be specified therein, being the date of receipt of application for the license, or the date of issue thereof, or some date subsequent thereto, and shall specify the parish, county, locality, or timber reserve, embracing the Crown lands, to which it applies, and shall specify the particular kind of bark to be obtained. It shall be subject to the conditions of these Regulations,

and shall not apply to lands permanently dedicated to any public purpose nor without special authority of the Minister, or the Forest Officer, to any Crown lands or species of wattle which may be notified in the *Gazette* as exempt from its operation, or to any of the following Crown lands, viz. :—

Reserves for Public Recreation.
Reserves for Camping.
Reserves for Plantation Purposes.
Quarry Reserves within any Municipality.
Reserves for the Preservation of Timber in the Western Division of the State.
Reserves for the protection of Native Flora or Timber for Scenic Purposes.
Public Watering Places.
Sites for Towns or Villages, or lands within the Town and Suburban boundaries of any City, Town, or Village.
Lands included in a Temporary Common unless within the limits of a Timber Reserve.
Land within 1½ chain of any navigable river, lake, or watercourse, or within the basins of any lake.
Land within half a mile of a Head Station or Homestead in the Western Division of the State.
Lands held under Saw-mill site Licenses.
Lands measured for Sale or Settlement Purposes.
Lands held under conditional or special or settlement or residential lease, except any such lands included in a Timber Reserve.
Church and School Lands under lease.
Lands within Proclaimed or Scheduled Roads.
Lands within 10 chains of any tank, dam, or excavation for the conservation of water.
Lands held under Brickmaking or Quarrying Permits.
Islands on any rivers or lakes of the Eastern Watershed of the State.

27. A tan-bark license to strip wattle-bark, or the bark of such other trees as the Minister may permit to be stripped for tanning purposes on Crown lands, shall entitle the holder to enter upon any lands specified in the license, and shall be subject to these Regulations, excepting as to the stripping of bark ; and no tree of less girth than 12 inches of either the black or feather leaf, or the golden or broad leaf species of wattle, measured at 2 feet from the ground, shall be stripped ; and the licensee shall be required to thoroughly strip one tree before commencing another.

28. Excepting in the case of wattle or other trees authorised to be stripped for tanning purposes, the holder of a tan-bark license shall not by virtue thereof strip the bark from any standing tree.

29. All bark stripped under the authority of a tan-bark license shall be removed from Crown Lands during the currency of such license, or during the currency of any subsequent license if such subsequent license takes effect immediately after the date of expiration of the preceding license. Provided that no person shall have a right to hold bark more than three months without special permission, notwithstanding that the license under which it has been obtained may have a longer currency than three months. Any person desiring an extended term for removing same may forward an application to the Forest Officer of the District, or, in the case of there being no Forest Officer, to the nearest Crown Lands Bailiff, setting forth particulars of the quantity and description of the bark claimed, how long obtained, locality where lying, and cause of non-removal, with particulars of the licenses under which the bark has been held ; and if the Minister is satisfied that difficulties exist to the removal of the same within the prescribed period he may extend such time for removal upon such terms and conditions as he shall think proper ; and all such bark which is not removed within such period, or such extended period, shall be held to have been abandoned.

30. A tan-bark license to strip bark for tanning purposes shall confer no right on any person to occupy, cultivate, or improve, or to erect machinery or to reside upon Crown lands, and shall confer no right of grazing. It shall not be transferable without the consent and endorsement of the Forest Officer, and excepting as herein expressly provided it shall not confer any privileges of exclusive possession, save as to the bark actually in process of being stripped or removed or held in accordance with these Regulations.

The penalties are :—

For the unauthorised barking or wilful destruction of any sapling or tree without felling, to a penalty of not less than 1d., or more than 10s., for each tree injured or destroyed. (*Vide* Regulation 43.)

For disobeying, infringing, or violating the provisions or conditions of the Regulations, under cover of a license or permit, to fines not less than 20s., or exceeding £5, first offence; not less than £5, or exceeding £10, second offence; not less than £10, or exceeding £20, third offence, exclusive of the value of timber or material destroyed. (*Vide* Regulation 44.)

To the liability to forfeiture, and the non-further issue of any license or permit, for the breach of any condition or obligation, or the failure to perform any act or matter specified in such. (*Vide* Regulation 45.)

Mr. Baddeley's figures for licenses have since been amended, as I have shown. It may be that our girth limit (12 inches at 2 feet from the ground) is too low, but this was suggested as the minimum by a recent conference of foresters. It is, of course, difficult to indicate a minimum girth which will be satisfactory all over the State.

Much of the inferior wattle-bark now on the market is undoubtedly the product of private lands.

Important factors connected with the welfare of the wattle-bark industry in New South Wales are stripping at maturity, proper drying and grading of the bark. It may be that the Government will find it necessary to step in and grade bark as it has graded other products. But whether this step is taken or not, the present unsatisfactory state of the industry is a matter for regret.

The Soil.

(*a*.) GENERAL CONSIDERATIONS.

No one who has troubled to make the observation can fail to notice how wattles frequently flourish naturally on the poorest soil, and thus it is that land can be utilised in this industry when it can scarcely be put under any other cultivation, and where not even grass grows. At the same time, bark richer in tannic acid and maturing earlier, may be obtained from trees growing on richer soil.

I give the following extracts from the Report of the Victorian Board of Inquiry in regard to the Wattle Industry, 1878 :—

"At the present time there are tracts of Crown lands on which the wattle flourish luxuriantly, although the soil is so poor as to be practically valueless, either for pastoral or agricultural purposes. These areas are peculiarly favourable to the growth of the wattle; and in such localities as the Victoria Valley, and the long sandy reaches of the Ninety mile Beach and other parts of Gippsland, it was found that the trees attained early maturity, supplying at the same time a bark of full strength and in good demand amongst tanners.

"Although there are here and there a few patches of soil of a better class, yet the land presents no inducements to the ordinary selector or grazier, and its utilisation, except for some such special object as wattle cultivation, is never likely to be attempted. With some discrimination certain areas of modified extent might eventually be selected, which would contain sufficient agricultural land to enable their holders to partially combine farming pursuits with the occupation of wattle growing.

"The Board also noticed that many extensive areas of land in the districts specified were leased for grazing purposes at a nominal rent, and it was often on patches most barren of grass or surface vegetation that the finest specimens of wattle trees were met with. For the purposes for which they are leased these lands are practically valueless; they may be denominated thorough waste lands. The State derives little or no revenue from them, the return in some cases failing to pay the cost of supervision.

"The Board have inspected many of these areas, and from their personal observations are unanimously of opinion that, as soon as practicable, they should be withdrawn from ordinary selection, and set apart for wattle cultivation. By doing so the State would gain largely, and the interests of the pastoral tenants who are now in occupation would not suffer in any degree, as their evidence goes to prove that the land in question is almost useless, one witness stating that portions of his holding required 40 acres to keep one sheep alive.

"The Board consider that large areas of these poor lands should be leased out, in blocks of a certain size, for a term of years, the lessee to be made subject to certain rules and regulations which would have the effect of ensuring the annual and permanent cultivation of wattles. The rest would be a matter of detail; but that the principle of wattle plantations should be adopted is one of the strongest recommendations of the Board."

In Natal, as I have already shown (see page 4), and also see my further comments (pages 11, 13, 17, 23), the *cultivation* of wattles has been undertaken with very great success.

"Mr. Sim says:—When one goes to the expense of preparing, cultivating, and reaping a wattle crop it will pay much better to use the very best soil he has . . . . . .

"Rainfall alone is not however, enough to secure a good crop, there must be a suitable soil, porous enough to receive the rain as it falls and to give it up as required. The physical condition of the soil is of much more importance than its chemical composition. Now it is quite true that poverty of soil does not alone affect it seriously, soil too poor to grow mealies (maize) or even oats is the very land selected by the best judges as the soil for black wattle, and the black wattle itself responds freely to such selection, but only it the mechanical condition is right." (T. R. Sim, p. 129 on Soil for Wattle plantations in Natal.)

And again—

" . . . . the best soil for wattle culture is not necessarily the best for agricultural crops—indeed, often it is not so—but I still maintain that selection of soil suitable as to mechanical condition, whether or not fit for cereals, is the most important step in wattle culture. The most suitable soil is the deep red or chocolate soil, resulting from the decomposition of igneous rock, considered by the farmer poor, but deep and porous, never saturated and never entirely dry. Such soil is frequent throughout Natal, particularly on the eastern slopes of the midland uplands: it is not difficult to work nor to keep clean, and is usually destitute of rock, except occasional doleritic boulders. Next comes deep alluvial black soil, though that often occurs where frost has to be reckoned with. Then the light sandy soil overlying shale, which soil, where sufficiently deep and moist, is very suitable, but is too often trusted where shallow, with the result that trees are small and become bark-bound and scraggy whenever a dry spell occurs. The shale itself is always to be regarded with suspicion, and the further it is away the better will the wattles do. But even worse than that is the metamorphic sandstone which forms the bedrock of many river beds and streams, and which should be avoided, except there be a very considerable depth of soil above. Cold clay is also to be avoided. Open sandstone at some depth is not objectionable" (pp. 130-1).

Returning to Australia, evidence shows that—

"The bark obtained from trees growing on limestone* formations is greatly inferior in tannin to that of trees grown on any other formation." (Report of Wattle-bark Board, Melbourne, 1878.)

"Sandy soil is best, lying upon a clay subsoil. . . . I do not think that taking a crop of wattles off land renders it useless for other crops; but I consider it an advantage rather than otherwise, from the deposit of leaves, which manures the land for other crops. There is nothing to prevent one crop of wattles following another immediately; you may take three or four off without interfering with the productiveness of the soil." (J. E. Brown.)

As regards the Southern Coast districts of New South Wales generally, it does not appear that wattles grow more plentifully or more luxuriantly on one geological formation than another. It may be that wattles do not grow so densely on the rich chocolate soil as on poorer ground, but this may be owing to the fact that bush fires do not occur so often on such ground as in the more open localities of usually poorer soil.

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* "This refers to *A. decurrens*, var. *mollis*, nevertheless wattles (*A. pycnantha*) grow exceedingly well on limestone country in South Australia." (F. Wurm, in *Journ. Bureau Agric. S.A.*, April, 1890.) See also some of my analyses of barks grown on limestone country.

In planting with wattles that wretched desert country near the Melbourne-Adelaide Railway, from Bordertown to Murray Bridge (hitherto considered useless for any purpose), Mr. J. E. Brown, in giving evidence before the above-mentioned commission, stated his intention simply to roll the scrub down, scatter the seed, and then set fire to the scrub. This rolling is effected by making a team of bullocks draw an old boiler; the larger saplings are previously cut with an axe.

"Five years ago I put in 50 acres of wattles in a very sandy portion of Mount Burr Forest, and next year I intend stripping it, and I have no doubt I shall receive 5 tons per acre from it. The country is very sandy—almost pure sand—the seed was sown broadcast, a flock of sheep run over it to trample it in, and the crop was so thick that we had to thin it twice."—(J. E. Brown.) Mr. Brown informs me that the first thinning gave 1 ton of bark per acre, and there then remained about 1,200 trees per acre. Calculating the small average of 10 lb. of bark to each tree, this would give a further amount of 5½ tons of bark, and thus the original estimate (made in 1888) was more than realised.

(*b.*) PREPARATION OF THE LAND.

In preparing the land, if it be virgin soil, unencumbered with scrub, and of a light nature, breaking up of the surface, sowing the seeds, and harrowing is all that is necessary. If the land be covered with scrub or other vegetation these should be cut down, burnt, and the land prepared in the usual way.

Mr. A. L. Thrupp, of Woodside, South Australia, is, in timbered country, opposed to the felling of the timber (non-wattle), as he is of opinion that the trees, if ringed, form, even in their dead state, a protection of no mean value against frost and high winds for the young wattle plants.

It must not be understood that any careless kind of cultivation will do for wattles, although when once started they will thrive with scarcely any attention, but, like other crops, *the better the system of cultivation adopted the better the yield, and therefore the greater the profit.*

Land should, if possible, be ploughed all over, and not merely have drills run out. The increased expense of the former method will be found to be many times recouped. It is usually sufficient to plough the land to a depth of 4 or 5 inches; 6 inches is better still, and may be considered the standard depth.

Mr. Alfred Cadell, who has devoted much attention to wattle cultivation, and has induced others to do so, even manured a portion of ground for a patch of wattles, and the increased growth which has resulted has given him much satisfaction. Of course, whether manuring (and in what quantity) will pay in a particular instance must largely depend on local considerations.

(*c.*) MOISTURE.

Wattles like a moderate amount of moisture, say from 18 to 20 inches. (F. Abbott.) *Acacia decurrens* will, however, stand considerably more. Mr. J. E. Brown has grown wattles (*Acacia pycnantha*) successfully with 10 inches of rainfall, but ordinary cultivators will not usually succeed with less than 16 to 20 inches per annum.

On the other hand, it is not good for wattle trees to have an unlimited supply of water, as they then tend to throw out too much leaf, and the bark becomes flabby and deficient in tannic acid.

In speaking of wattles with respect to moisture, we must bear in mind that they may be divided into two groups—the dry-country wattles, liking warmth and not too high a rainfall, of which *Acacia pycnantha* may be taken as a type, and the coast wattles, of which *Acacia decurrens* may be taken as a type, which are capable of flourishing with a much lower temperature, and with a far higher rainfall.

OBJECTIONS TO WATTLE-GROWING CONSIDERED.

I quote the following extract from a letter from a gentleman living in the Glen Innes district, who perused the first edition of this pamphlet. It is a thoughtful letter from one who has had some experience in the matter concerning which he writes. It places the difficulties (partly general and partly founded on local considerations) in a clear light, and I will proceed to deal with them seriatim, for convenience. The subject of wattle-growing will bear calm discussion, for we have much to learn in regard to it yet :—

"There are two methods of planting suggested by this pamphlet. First, by careful cultivation, which would be costly, and second, by broad-cast sowing, without much expense.

"To adopt the former method here, I should say, would be to result in failure, as I should think the land is far too heavily timbered (1)* to allow of the ground being cleared and cultivated, and if merely sown broadcast, as by the second plan, I cannot see how the young trees could be protected from being destroyed by fire (2). 'The author of the pamphlet suggests planting on the poorest soil,' even where grass never grows (3), but my experience here is that even the poorest country, when fenced off from stock, and with the usual amount of rain we get, a great deal of undergrowth and coarse grass will grow, thus always being a source of danger to the young plantation, and leaving its fate to the tender mercy of the flames. I have tried a few seeds of the better kinds of wattle, amongst others *A. decurrens*, but could not get them to live through more than one or two winters (4), and I have noticed lately that a great number of wattle trees, known as 'hickory,' seem apparently killed, I presume by the frost.

"I will, however, plant the seeds you kindly sent (though I suppose the best results could not be expected, as the pamphlet recommends the beginning of winter for sowing), and I will, in due time, let you know the result. I had, some three or four years ago, an idea of going in for wattle cultivation, and with that intention I fenced off a paddock of about 50 acres, but found the cost of clearing too great, so I let the matter drop ; but I am still of opinion that there is some of the most suitable soil in the State for wattles, if we only knew the right kind to go in for (5)."

1. This is a local consideration which will apply to preparing the land for *any* crop. A wattle crop is remunerative, but to what extent it can stand being debited with expensive clearing is a matter for decision in each separate case.

2. Wattles are protected from fire by fire-breaks, and also by removing inflammable rubbish from amongst them. At the same time, the finely divided foliage of *Acacia decurrens* makes it the most susceptible of the commercial wattles to destruction by fire. *Acacia pycnantha* and *A. penninervis* are much less liable to this danger.

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* The objections which are numbered (1), (2), &c., are dealt with seriatim at the close of the letter.

3. The matter has been dealt with already, but I may quote the following extract from the evidence of the late Mr. W. Ferguson, before the Victorian Royal Commission on Vegetable Products :—" Now I consider that any man who has a desert of poor land, which would not grow anything else—that would not grow cereals—could not put it in to anything better than a crop of wattles, if he attends to it properly." The Murray desert is a case in point.

At the same time I have endeavoured to make it clear that utilization of better soil and good methods of cultivation will pay. But to what extent wattles will successfully compete with other crops on a given soil in any district, can only be ascertained by local experience.

Straggling grass is undoubtedly a danger to a wattle plantation, but it will always pay to keep it in check.

4. There are few districts in the State which are too cold for the growth of the best wattles. Having decided on the proper wattle, seed should be obtained from a district approximately similar in climatic conditions, and well matured.

5. I trust that this objection has now no weight in it.

The Seed.

(*a*.) COMMERCE IN WATTLE-SEED.

It would be false economy to allow considerations of price to stand in the way of obtaining the best seed procurable from thoroughly healthy trees, for the ordinary cultivator only requires a pound or two, and the outside cost will only be a few shillings. Is the success of a plantation, perhaps involving an interest of hundreds of pounds, to be jeopardised through haggling with a seedsman over a few paltry shillings ?

At present, of course, our seedsmen must mainly obtain their supply of *Acacia pycnantha* seed from South Australia, while *decurrens* seed, of excellent quality, may be obtained from within our own territory, as well as from Tasmania and Victoria. It will be to the interests of Sydney and other seedsmen to establish local agents willing to push wattle-seed in districts already found suitable, or supposed to be so, for any or all of the species recommended for cultivation ; and I hope it is unnecessary to insist on the common-sense advice of noting, approximately, the localities from which seed is collected, in order to prevent it being sent to districts totally different in climatic conditions. The best wattles are found growing under a great variety of circumstances, so there is no necessity to handicap the cultivation by ignoring local conditions.

Too great care cannot be taken to see that the seed-collectors do not mix silver wattle seed (*A. decurrens*, var. *dealbata*) with *decurrens*. I have received complaints from New Zealand, and nearly every one of the Australian States, of mixed seed being supplied to planters.

The best Tasmanian *decurrens* seed comes from the east coast, viz., Spring Bay and Swansea ; the best Victorian comes from the Portland district ; the best New South Wales from the Eden (Twofold Bay) district. At the same time, there are considerable areas in all three States which produce fine trees and excellent seed.

(*b.*) QUANTITY OF SEED REQUIRED TO THE ACRE.

I have been often asked, "How much wattle-seed is required to the acre?" and the question seems simple enough, but it is hardly as easy to give a precise answer. We have three sets of circumstances to consider:—

1. The kind of wattle-seed used, whether a large sort (*e.g.*, *pycnantha*), or a smaller one (*e.g.*, *decurrens*), and it must also be borne in mind that seed of the same species may vary considerably in size. Following are some careful determinations of authentic seeds:—

pycnantha, 23,800 seeds to the pound.
decurrens (normal variety from about 50 miles south of Sydney), 28,500 seeds to the pound.
decurrens (*mollis* variety, from the celebrated Portland district of Victoria), 36,200 seeds to the pound.
decurrens (*mollis* variety, Tasmanian commercial sample), 38,300 seeds to the pound.

2. Whether broadcast sowing, or the bamboo method of planting, be adopted. If the latter method, one has simply to compute the number of trees required to the acre, and knowing the number of seeds to the pound, we have the necessary data for calculating the quantity of seed to be purchased. It will be remembered that two seeds must be planted in each bamboo in case of accident. In broadcast sowing, Mr. Brown calculates (*see* page 25) 30 lb. of *pycnantha* seed to 100 acres, say ⅓-lb. seed to the acre. Mr. Perrin calculates 1 lb. seed to the acre. These are but estimates, and a margin must be allowed, for one cannot say more than that the quantity required will be from ⅓ to 1 lb. per acre. It largely depends on the care of the sower, but the latter quantity must never be exceeded. In the bamboo method, practically every seed germinates, and none of the plants have to be wasted in thinning, as is the case in broadcast sowing.

3. The kind of wattle grown, and the distance apart of the trees.—According to the kind of wattle, whether a large sort (*e.g.*, *decurrens*), or a small one (*e.g.*, *pycnantha*), they will require to be planted at different distances apart, viz., about 10 feet *decurrens*, and 3 to 6 feet *pycnantha*.

Now the number of trees to the acre planted—

3	feet apart is	4,840
4	,, ...	2,722
5	,, ...	1,742
6	,, ...	1,201
10	,, ...	435

(*c.*) PREPARATION OF SEED FOR GERMINATION.

The outer covering of the seed is of great hardness, and under ordinary circumstances it will remain in the ground for many years before germination.

I was indebted, in 1890, to Mr. William Neilley, of Sydney, for what appears to be a well-authenticated instance of wattle-seed remaining dormant in the ground for over thirty-seven years. An allotment of land in the town of Bega, purchased from Mr. Spence, formerly had wattles on it, but the trees and all wattles near had long since been destroyed. After a lapse of thirty-seven years Mr. Neilley had the land ploughed, and wattles sprang up thickly when the ground was trenched.

Bush-fires, however, usually hasten matters, and it is well known that perfect forests of young wattles spring up in many places after these occurrences. The operations of nature are, therefore, assisted in practice by means of heat, and this heat may be either dry or moist. For the first, Mr. J. E. Brown recommends a quantity of brushwood to be burnt to the condition of expiring embers. "In this residuum of the fire the seed is placed, and mixed up with the ashes and charred coals, and the whole is then allowed to remain until cooled down. The seed is now ready for sowing. If the intention be to sow it singly, by dibbling or in some other way, it will have to be cleaned and separated from the residue of the fire by riddling, or by the aid of an ordinary grain-winnower. If, however, the seed is to be sown broadcast, it will be sufficient if the embers are raked off the heap, and the remainder, containing both ash and seed, stored ready for sowing. The advantage claimed for this method of preparation is that the seed can be sown either broadcast upon the ground without covering, or dibbled in the soil in the ordinary way, at any season of the year, and especially before the winter rains set in." Care will, of course, require to be exercised to prevent loss by over-burning. A frying-pan is used by some people for roasting wattle-seeds, and the danger of over-heating will be minimised if a little water be put into the frying-pan.

Secondly, the method of treatment by boiling, or hot water. Mr. Brown has recommended that the seed be placed in a vessel, water *almost boiling* poured upon it, and left to soak for one or two days; the seed is then taken out and kept damp in a bag until swelling takes place. "The only drawback to this system is that, when sown, the seed must of necessity be covered with soil, and that the operation be carried out in the winter season only. Unless the seed be covered as it is put out, so as to keep up the necessary supply of moisture to complete germination, a change of dry weather would undoubtedly result in its entire loss." Nevertheless, this is the method which Mr Brown recommends growers, especially beginners, to adopt.

Professor Tate, who, in addition to his scientific knowledge, had much practical experience in wattle-planting, instituted a series of experiments upon the temperature to which wattle seed may be exposed in assisting it to germinate. The experiments are useful, in that they enable the operation of treatment with hot water to be conducted with greater confidence. In my own case I have been afraid to destroy the vitality of seed by the application of too high a temperature; but Professor Tate shows that the seeds may be *boiled* for several minutes without injury, though there is no advantage in heating the water akove 150 degrees F. I quote his experiments from Mr. Brown's Report:—

Experiment 1. *Acacia pycnantha.*—Equal parcels of seeds saturated with water at the following degrees of temperature:—

150°, 170°, 190°, 200°, 212° } The seeds germinated in about equal proportions at the end of three weeks.

Experiment 2. *Acacia decurrens.*—Seed saturated with boiling water, and kept in wet sand in a warm place, germinated at the end of two weeks.

Experiment 3 *Acacia leiophylla* (*saligna*).—Seed saturated with water at 212°, 22nd July; seeds began to burst, 29th July.

Experiment 4. *Acacia pycnantha*—

22nd, July boiled for 1 minute
" 3 minutes
" 5 "
" 7 " } All the seeds germinated 9th August.

(*d.*) THE BAMBOO METHOD OF TREE-PLANTING.

The history of the bamboo method of tree-raising, largely used in India, and successful in every State of the Australian Commonwealth, has been told by the late J. Ednie Brown in his "Tree Culture," is interesting, and is not generally known. "In the Forest Department of India, a system of rearing young plants in short pieces of bamboo cane was introduced a good many years ago by a Captain Beddome, one of the conservators of forests there. This was found to be admirably suited for the purpose, and is thus briefly described in the *Journal of Forestry* for July, 1880 :—" Cut the bamboo of which estate baskets are made, and which is not more than an inch or two in circumference, into bits about 3 inches long. Place these pieces endways close together, in thousands, cover with forest mould or fine soil and sow your seed. In this way there will be from one to three or four seedlings in each piece of bamboo. When carried out in the bamboo the best plant can be left, the others being removed and utilised immediately or at a subsequent period."

"When the subject of forest conservancy was first mooted in this Colony, His Excellency Sir Anthony Musgrave, the then Governor of South Australia, in a lecture on the subject, incidentally referred to Captain Beddome's system, which he had heard of or seen carried into effect in India. The idea of trying to adopt the method of tree-planting here was not, so far as I am aware, suggested at the meeting in question, simply, I would suppose, from the want of bamboos wherewith to carry it into effect. The idea, however, occurred to Mr. Murray, who was subsequently appointed as Conservator to the Forest Board of South Australia, that the same results might be obtained by the use of small pieces of the well-known reed, *Arundo donax*. Acting upon this notion, he had several pieces prepared, filled with fine soil, and gum seeds sown in them; and the result was such that, on his appointment to the Forest Board, he suggested that he might be allowed to apply the system to the planting of the Bundaleer reserve, where the Board had just commenced operations. This the Board allowed, and, under the immediate supervision of Mr. John Curnow, nurseryman, the system has been carried out at Bundaleer with a certain degree of success in the raising and planting of *Eucalyptus* plants. With pines it has proved a failure."

The "bamboo" chosen is the common Danubian reed (*Arundo donax*), which flourishes in many parts of this State in muddy situations or by the sides of lagoons. The stems are cut by means of a treadle-saw and a gauge to a uniform length of about 5 inches. It is a matter of considerable practical importance to secure uniformity of length and to see that they are cut absolutely at right angles to the axis. The properly prepared fine soil is put into a stack of tubes standing on end and placed close to each other. It is necessary that the soil should completely fill each tube, and this is secured by tapping the tubes from time to time by means of a wooden beater. A little seed is placed in each tube, and the tubes are watered. The tubes are stacked in boxes, moderately tightly, so that they will remain vertical, but not too tightly, because expansion takes place, seeing that the tubes are kept wet. And here it may be mentioned that it is of practical importance to see that the bamboos are not too thick or tough. The bamboo tube is really a flower-pot, but with this difference: that tube and all are planted, so that if the tube will not readily decay in the ground the tender plant becomes pot-bound, or rather tube-bound, and will die or be retarded in growth. It requires

judgment to select the tubes, and some growers half rot their tubes before putting seed in them, and sometimes they slit the bamboo or cut away the septum (partition of bamboo). Suppose the little trees to have been successfully grown, they are taken to the place of planting in boxes of a convenient shape.

The method of planting will depend upon circumstances. In operations on the forestry scale, two or more men are employed, a slit is made in the ground by means of a spade, another man comes along and drops in a bamboo-tube with its plant and fixes the earth with his feet, or this is done by a third workman. It is very important to plant the tubes vertically, and to let the top of each be just below the surface. A farmer or other planter who wishes to put in only a few trees, may insert them with the trowel if the soil is sufficiently open. It is obvious that any man of common-sense will, according to his local circumstances, devise labour-saving methods for planting the trees thoroughly and cheaply, for forestry operations, to be successful, must have the cost of tree-planting cut down to the absolute minimum. I am not in favour of tree-planting by contract, except with a well-tried gang of men.

Mr. Walter Gill, the Conservator of Forests of South Australia, has an excellent illustrated article on the subject in the *Agricultural Gazette of N.S.W.* for December, 1900, p. 1130.

A wattle planter in New South Wales substitutes little twists of brown paper for the "bamboos," and doubtless other simple expedients are in use. The brown paper is rolled round a stick, screwed at the bottom, filled with earth, and the seeds planted therein. The paper attracts water to the soil during the dry season, and prevents too much water getting at it during the rainy season. As the industry gets established on a firmer footing, "bamboos," will be available (they grow like weeds in damp localities not too cold); meantime, any ingenious man can get over the lack of them.

(*e.*) BROADCAST SOWING.

Mr. G. S. Perrin, late State Conservator of Forests, Victoria, recommends half a bushel of sand to be mixed with each pound of seed sown, and after treating the seed with hot water, as before described, to broadcast thoroughly, as in sowing wheat. He justly remarks that, if done with discretion, much after-labour will be saved in the thinning process.

Mr. F. Abbott recommends that the seed be soaked and simply sown broadcast on ploughed ground.

In soaking seed (as directed) for sowing, sufficient only should be prepared for one day's sowing at a time. Where seed has been soaked and sown, it must be covered immediately with soil, say by means of light harrows.

Seed is preferably sown immediately the winter season has set in.

"Mr. F. Krichauff, of South Australia, caused wattle seeds to be sown upon some sandy land in the Bugle Ranges during May and August. Those sown in August made much greater progress than those sown in May. The seeds were sown upon a young barley crop, and then trodden in by sheep."—(*Journal of S.A. Bureau of Agriculture*, Nov., 1889.)

Addendum.

Following are extracts from a leaflet, giving a few simple directions in regard to wattle cultivation, which was issued by the Superintendent of

Technical Education, under the direction of the Minister of Public Instruction, in 1890. Some of the points have already been touched upon :—

"*Nursery.*—If there be only a small area to be planted with wattles it is best to raise seedlings in a nursery. Whilst young they can be easier looked after and protected. Wattles will not stand transplanting at every season of the year with any degree of success; therefore they should be planted in small flower-pots or bamboos, in which they can be readily taken to the open ground. If grown in flower-pots, three or four seeds in each will be sufficient. When the plants are up, weed out all but the strongest one. After they are a few weeks old the pots will be found to be full of root; they should then be removed to their permanent home. To take them out of the pots, turn them upside down, and by placing a finger in the drainage hole at the bottom of the pot the plant with its roots can be easily taken out, and will suffer nothing by removal. The seeds are sown in boxes containing peaty loam, mixed with clean sharp sand, the soil being kept always moist. When the seedlings are sufficiently established they are transferred to the open ground.

"*To sow broadcast or in drills.*—If the seeds have been assisted in their germination by means of hot ashes, rake or sift out the larger coals and sow the ashes with the seeds. If the germination has been commenced by the hot-water process, mix the seed thoroughly with dry ashes or sand—this will prevent the seeds from sticking together—then sow broadcast or in drills in the usual way. If the seeds are to be dibbled they must be freed from the ashes. Whichever method be adopted for sowing, the seed should be well covered, and in the case of those that have been soaked in water this is essential, for a few hot and dry days would effectually check all further growth. Three or four seeds at about *three feet** apart is the distance required; this will allow for thinning.

"Do not cover the seeds too deeply; about an inch underground will be ample.

"Sow sparingly; this will save a lot of thinning afterwards."

The Tree and its Bark.

(*a*) PRUNING AND THINNING.

Wattle-trees are sometimes recommended to be pruned. "The advantages of this are larger dimensions of individual trees, and hence more bark in proportion; cleaner stems, easier stripping at less expense, less liability to disease, and quicker returns, because the tree will arrive at the stripping stage sooner by having its vitality confined chiefly to the stem. The best period for pruning is during the months from January to March." (J. E. Brown.) Mr. A. L. Thrupp, however, deprecates pruning in warm northern exposures, as too much sun would be admitted to the stem of the tree.

If wattles be not planted too far apart, nature does her own pruning of the lower branches. In a plantation of *Acacia decurrens*, for instance, the trees obstruct the light from each other, inanition of the lateral branches takes place, which wither and fall off, and thus a long clean stem is produced, from which the bark can be readily stripped.

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* *Acacia pycnantha* is here alluded to. They will thin out to 4 or 6 feet apart. Cf. p. 25.

Mr. F. Abbott recommends that wattle seedlings be thinned out, as soon as they are big enough to handle, to 10 feet apart.* This is perhaps a fair distance, but authorities do not agree as to the precise distance. It rather resolves itself into a matter of common-sense, for one must, on the one hand, avoid having wattles too close to each other, otherwise "leggy" trees are the result; and, on the other hand, trees too bushy are not desirable.

(*b*) TIME OF YEAR FOR STRIPPING.

Wattle-barks are often gathered all the year round, whereas they should only be stripped for three or four months in the year (the months usually recommended being September, October, November, and December)†; out of that season there is usually a depreciation of tannin in the bark. In these months also, the sap usually rises without intermission, and the bark is easily removed from the tree. The impression appears to have prevailed amongst bark-strippers that whenever the bark would strip it possessed full tanning properties, but this is erroneous. After a few days of rain during other seasons of the year, a temporary flow of sap will cause the bark to be easily detached from the trunk, but then it is greatly inferior in quality. (*Report Victorian Board.*)

(*c*.) HOW TO STRIP.

A cut in the bark should be made about 3 or 4 feet from the ground, and a sheet pulled off *downwards*. In this way bark is saved, even to that which is found on the large roots, and bark stripped close to the ground is usually the thickest and richest in tannic acid. It is well known that strippers often neglect the bark to which allusion has just been made.

Some people fell their wattles before stripping, and use the wood for firewood. Bark-strippers as a rule leave about a third of the bark on the tree, besides leaving unsightly dead trees. It should also be borne in mind that dead and decaying trees are a source of danger to the plantation, owing to the harbour they give to insect pests. The matter of utilising the bark on the twigs, &c., will be alluded to under "Extracts."

(*d*.) AGE AND SIZE OF TREES.

Wattle-bark should only be procured from mature trees, *i.e.*, from those whose bark possesses the full natural strength. The Victorian Board states, as has already been noted, that bark-stripping (*decurrens*) may profitably commence at the end of the fifth year, and returns undoubtedly commence not later than this period.

Mr. A. Bucknall mentions that wattle trees mature in seven years in the Majorca plantation, Ballarat. Mr. W. Ferguson, of Victoria, makes the general statement that none (*decurrens*) should be cut under 5 inches in diameter—a reasonable suggestion which might be enforced, on Crown lands, by legislative enactment.

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* This advice refers to rather large trees, such as *decurrens*, and not to small wattles, such as *pycnantha*. Cf. p. 24

† No fixed time, applicable to all parts of New South Wales and to varying seasons, can be given. Farmers and others will have to find the best time from their own experience, supplemented, of course, by assays of bark stripped at various periods.

"The preponderance of the evidence given on behalf of the tanners went to prove that unless the supply of good bark—that is to say, the bark stripped from the trees of at least five years' growth—was maintained, the tanning industry would suffer." And again—"The age at which trees may be stripped with the best advantage has been determined at from five to ten years." (*Report of Wattle-bark Board of Inquiry, Victoria.*)

The Regulations of the New South Wales Forest Department prohibit the stripping of trees under 4 inches in diameter at 2 feet from the ground.

Mr. J. E. Brown strips his wattles (*pycnantha*) at about six years of age, but the exact period can only be decided by the cultivator's common sense.

Mr. Thrupp states, as his experience with *pycnantha*, that greater weight of bark can be produced in five years when cultivated, as against 8-year-old bark grown in its natural state. (*Journ. S.A. Bureau Agric.*, April, 1890.)

It is to be hoped that farmers and others will institute some experiments with the view to estimate the improvement in quantity and quality of wattle-bark under cultivation, but such experiments, to be conclusive, must have the data carefully checked, in order to make sure that the comparisons of wild and cultivated trees are as fair as possible.

(*e.*) TO INCREASE BULK OF BARK.

Mr. Thrupp states that if the bark of a wattle tree of three or four years be slit down on the south side with a sharp knife, from root to first branch, the increase in the bulk of the bark will be considerable. This has been tried in the Montacute District of South Australia successfully for years. Spring is the proper time for this work. (*Journal S.A. Bureau of Agriculture*, November, 1889.) A correspondent of mine, engaged in wattle cultivation in the Blue Mountains, has also practised this method with success. He has instituted comparative experiments, and is convinced of the advantage of the process in increasing bulk of bark. He performs the operation in the early winter (May or June).

(*f.*) FIBRE IN BARKS.

The best wattle-barks contain comparatively little fibre. A good bark will, as a rule, grind to a fine powder, while one which with the same treatment forms a fibrous substance is, as a rule, to be avoided. I have not, however, come to any conclusion with respect to the connection between percentage of tannic acid and fibre. The practical disadvantages of a too fibrous bark are twofold; firstly, it cannot easily be disintegrated (this may perhaps be got over by substituting cutters for crushers); secondly, a disintegrated fibrous bark may be so bulky that sufficient cannot be got into the pits to tan the leather, and when it is exhausted it is difficult to remove. This difficulty need not be insurmountable, but in a few years it is to be hoped that the supply of little-fibrous bark will be adequate.

(*g.*) DRYING OF BARK.

Mr. A. L. Thrupp, in a paper read in March, 1890 before the Congress of Agricultural Bureaux in Adelaide, carefully warns tanners and others against receiving wattle-bark damp, pointing out that bark in that state engenders mould "of a most virulent form," is liable to spontaneous combustion if

stacked in the hold of a vessel, and, while bark received green will tan hides as fast as bark received dry, still, there is the undeniable fact, in nine cases out of ten, that leather produced from bark so received, so stacked, and used for tanning purposes is spotted, and therefore of second rate or third rate value.

Apart from the intermittent supply already alluded to, it is owing to the greedy and indiscriminating way in which wattle-bark has been gathered, and the moist condition in which it has often been shipped, that purchasers in England, finding the quality variable, have not entered into its regular employment as largely as might have been expected.

Too much attention to this question of drying cannot be given. I have seen excellent bark sent to market in a mouldy condition, and sold for next to nothing. Bark must be dried *on the spot.* This is usually carried out in a large weather-shed, and the operation takes several weeks, the precise time being of course dependent on climatic circumstances. It is usually laid on saplings, the sap side downwards. Where an engine is used at the stripping depôt, common sense will dictate some method of utilizing the waste-heat to dry the air in the shed, but bark must not be subjected to a high temperature, otherwise diminution in tanning-power will take place.

(*h.*) GRADING OF BARK.

The physical characteristics of barks require to be taken into consideration as well as percentages of tannic acid, and consignments should be as nearly uniform as possible. Bark should be classified or graded just as wool, fruit, &c. No care spent in this direction will be unrewarded, and no kind of raw product has suffered more from slap-dash, empirical judging than wattle-bark.

Special brands of bark well known to buyers sell readily, so it is advisable to endeavour to cultivate their good opinion by sparing no pains to keep bark up to a standard quality, and by using a particular brand or trade mark.

In the present rule-of-thumb method of dealing with consignments of wattle-barks, localities have much to do with the price obtained; while bark from localities bearing a good reputation finds ready sale, new localities have a prejudice to contend against. Thus, speaking of New South Wales bark at the Sydney sales, that from Braidwood and Bega sells readily, while southern bark is greatly preferred to northern. Now these distinctions are based upon the solid rock of mature experience, but it is an undoubted fact that they are sometimes pushed too far. Wool is judged critically; the time will come when bark will be judged as critically—on its merits—with the advancement of technical education.

(*i.*) EXPORT, PACKING, &c.

In regard to the preparation of bark for export, the following letter from a well-known London firm of brokers, which appeared in the *Leather Trades' Circular and Review* of the 8th March, 1887, is valuable:—

"In reply to a question as to the best form in which to ship mimosa (wattle) bark, we beg to state that the trade, as a rule, prefer it ground, so long as they can be sure it is not adulterated. Some few, however, cannot

be satisfied unless they grind it themselves. We should recommend shipments of well ground, with a few parcels chopped or crushed in *bags*, but as we know that freight is heavier on the latter, and buyers expect a reduction of from 10s. to 20s. per ton to cover cost of grinding, the former will generally be most satisfactory to shippers. We think that the strength is better preserved in the chopped than in the ground, but there is nothing we can suggest as an improvement on the best standard marks of Adelaide ground. If shipments of chopped be made, it should on no account be shot loose in the ship's hold."

Barks are sent into commerce in one or more of four forms :—

1. In the bundle.

"In this form its quality can be more readily judged; but when the supply of mature trees became diminished, nearly all the bark was chopped or ground prior to shipment, good and inferior being bagged together."

2. Chopped, *i.e.*, into pieces a few inches in length.

In the Sydney market bark is usually sold chopped, in bags.

3. Ground, forming a substance something like "tow"; and
4. Powdered, that is of course, if the bark is not too fibrous to permit of this being done. It is not desirable to push the process of grinding too far, as wattle-bark is no exception to the generality of powders, in forming "balls," when thrown into water when too finely ground.

(*k.*) ADULTERATIONS OR SUBSTITUTIONS.

Good wattle-bark is sometimes mixed with inferior, and this admixture may be either intentional or accidental. "Blue bush" bark (*Acacia brachybotrya*, page 66), for instance, is sometimes chopped up to adulterate *pycnantha* bark. Silver wattle-bark (*decurrens* var. *dealbata*) is occasionally so like green or black wattle-bark (*decurrens* var. *mollis*), that it would deceive an expert, particularly if chopped, and while the two barks can be instantly separated, as a rule, I can readily understand specimens of silver wattle-bark mixed with bark of better quality, and passing muster. The subject is a wide one, and these few notes are simply intended to warn the unwary.

Profits and Loss and Minor Industries.

PROFITS TO BE DERIVED FROM WATTLE CULTIVATION.

In Australia we are chiefly dependent on estimates in lieu of statements of results attained, but those which follow are as trustworthy as can be supplied. Wattle conservation and cultivation have been inadequately taken up in our own State.

Following are the opinions of gentlemen in the several States on the prospect of profit in wattle-planting. They are culled from the reports of the Victorian Royal Commission on Vegetable Products (1888) :—

New South Wales.—Mr. Charles Moore, F.L.S., Director of the Botanic Gardens, Sydney,—"They are a very profitable crop indeed."

Tasmania.—Mr. F. Abbott, Curator of the Botanic Gardens, Hobart,—"I have not the shadow of a doubt that they are a valuable crop to any farmer; they come on in a very short period, and there is always a revenue from them."

South Australia.—Mr. J. E. Brown, F.L.S., when Conservator of Forests, Adelaide,—"With regard, however, to the wattles, there can be but one opinion as to their cultivation being the means of a large and most valuable source of revenue both to individuals and to the State."

Victoria.—Mr. I. Hallenstein, tanner, currier, and leather merchant, Melbourne,—"I do not think a farmer or anyone with the means could produce any crop more valuable than the wattle-bark. We have got faith in it, or we would not have gone to the expense of putting 800 or 1,000 acres under cultivation."

The following evidence was given by Mr. W. Ferguson, Inspector of State Forests, Victoria :—

"I calculated that from the time the seed was sown at the Majorca plantations, Ballarat, in seven years we should get about 10 tons to the acre of bark. That is, off the trees that were fit for barking at that time, and at the rate—of the present rate of bark—it varies from £8 to £10 per ton.

"You would get 10 tons to the acre? Yes.

"From trees that have been how many years growing? Seven years.

"That would average £10 a ton? Yes, at the present,—and it is likely to be more.

"That is, £90 per acre? Yes.

"That will be about £13 per acre per annum? Yes.

"Would that take all the trees, or leave a portion remaining? No, only the first thinning out.

"How many thinnings would that plantation admit of year after year? For years and years to come, because you will find them in all stages of growth. But I calculated that from the first thinning out.

"And would that yield as much each succeeding year? It would yield as much each succeeding year.

"So that you might get 10 tons per acre in each succeeding year? Annually for years to come, if they are judiciously thinned, but not as they are thinning (destroying) them in the forest. If they are properly cultivated—cultivated for profit.

"Can you mention any other crop grown in Victoria more profitable than that? No; and it is grown on such poor land, where neither grass nor anything will grow. In Rodney, where I mention, there is not a bit of grass to be seen, and there the wattles come up thick."

At the sewage farm at Islington, near Adelaide, Mr. J. E. Brown planted 40 acres in wattles. "The seed was simply soaked in hot water and broadcasted, and the soil afterwards harrowed with a brush harrow. Altogether, the whole expense of seed, preparation of the ground, and putting the seed in cost about £15. Four years afterwards the wattles were simply thinned, and the bark of the thinnings realised £25, thus more than refunding the

original outlay. Next year I hope the thinning will realise something like £3 per acre. In three years time from this (1888) we purpose stripping the whole crop, when I am certain it will realise at least £50 per acre." Mr. Brown informs me that the second *thinning* alone, made in 1889, realised £200, equal, of course, to £5 per acre.

The following detailed estimates must be used with great caution, since the price of bark, of fencing material, &c., have changed much during the past twenty years. At the same time they are useful in that they indicate items which must be borne in mind :—

Detailed Estimates.

1. The following statement showing the profit to be derived from the systematic cultivation of wattles, was compiled from the evidence given before the Board of Inquiry on Wattle Cultivation, Melbourne, 1878, and forms an appendix to their report. (The Board recommended *A. decurrens* and *A. pycnantha.*)

Receipts derivable from a Wattle Plantation of say 100 *acres, planted in the manner proposed.*

Each acre planted with wattles* 10 feet apart, would carry 400 trees ; at the end of fifth year, trees would yield, say, 56 lb. matured bark ; stripping only every third tree, 333 tons would be obtained off 100 acres ; this, at £4 per ton, would give at first stripping.....	£1,332	0	0
In the sixth (or following) year, a similar number of trees would be stripped, the bark having increased in weight, say, 14 lb., the increased yield of second stripping would, therefore, be 400 tons, at £4, making	1,600	0	0
In the seventh year the remaining trees would be stripped, from which a still greater increase would be obtained, say 480 tons at £4, making	1,920	0	0
The aggregate yield of bark during the first eight years, 1,213 tons, amounting in value to	£4,852	0	0

Estimate of Expenditure on a Wattle Plantation of 100 *acres during eight years.*

Rent of 100 acres for eight years, at 6s. per acre per annum	£240	0	0			
Ploughing 100 acres in drills 10 feet apart	25	0	0			
Sowing wattles and actual cultivation, including cost of seed	37	10	0			
Supervision for eight years, say, £10 per annum	80	0	0			
Pruning the trees, taking off useless wood, &c. (only necessary for two years), 10s. per acre	50	0	0			
Incidental and unforeseen expenses	27	10	0			
Interest on the whole amount expended during eight years	240	0	0			
				700	0	0
† Actual cost of stripping and carting, as shown below ..	£1,516	0	0			
				1,516	0	0
‡ Profit balance, exclusive of improvements or supplementary sowings	£2,636	0	0			
				2,636	0	0
				£4,852	0	0

* This estimate is evidently based on the assumption that *decurrens* is the Wattle selected.

† The cost of stripping would not exceed 15s. per ton, on account of the facilities presented by the regularity of the trees, while carting would represent another 10s. per ton. These combined charges would be 25s. per ton, and on 1,213 tons would be £1,516, leaving a clear profit on 100 acres (after allowing for primary expenditure) of £2,636.

‡ In addition to the bark taken off the land, a fresh supply would be available in two years afterwards, as the Board recommend that every tree stripped should be replaced by another sowing. All improvement effected may be calculated as additional profit.

2. The following estimate is by Mr. J. E. Brown, and is taken from a report by that gentleman to the South Australian Legislative Council in 1884. (Mr. Brown recommends *A. pycnantha*) :—

Revenue.	£	s.	d.	Expenditure.	£	s.	d.
To value of property increased and improvements, say .	400	0	0	By purchase of 100 acres, at £3 per acre	300	0	0
„ value of 500 tons of bark, at £5 per ton	2,500	0	0	„ cost of substantial fence all round, say, 1½ miles at £50 per mile	75	0	0
				„ ploughing 100 acres, at 8s. per acre	40	0	0
				„ 30 lb. of seed, at 1s. per lb.	1	10	0
				„ labour sowing the seed in rows, say, at 5s. per acre	25	0	0
				„ scarifying between the rows twice, at 4s. per acre	20	0	0
				„ thinning and pruning for two years, at 10s. per acre per annum	100	0	0
				„ forming firebreaks during the third to seventh year, say, £5 per annum	25	0	0
				„ sundries	50	0	0
				„ interest on money expended during the seven years, say	280	0	0
				„ cost of stripping 500 tons of bark, at 25s. per ton	625	0	0
				„ cost of carting same to market, at 10s. per ton	250	0	0
				Balance, being clear profit..	1,108	10	0
£	2,900	0	0	£	2,900	0	0

Notes on above Estimate.—At the distances apart which I recommend the trees to be grown, namely, 4 to 6 feet, there will be an average of 1,200 trees to the acre. In order, however, to make due allowance for blanks, I base my calculations upon there being 1,000 only to each acre. £5 per ton is only two-thirds of the present selling price of bark. I give 5 tons as the probable yield per acre. That this is a low estimate will be admitted, when it is considered that this only allows for 10lb. of bark to be taken from each tree. (J. E. Brown.)

3. Estimate of expenditure upon, and revenue from, a wattle plantation of 100 acres, during a term of seven years, by Mr. G. Perrin, Conservator of State Forests, Victoria, 1889.

He recommends cultivation of the broad-leaf wattle (*A. pycnantha*); broadcast sowing.

EXPENDITURE.		£	s.	d.
To rent of land at 4d. per acre, under Wattle Cultivation Bill, at £1 12s. 4d.		1	12	4
„ fencing, say, 1 mile and three quarters, at £40 per mile		70	0	0
„ ploughing (and harrowing twice), at 14s. per acre		70	0	0
„ purchase of seed, 1 lb. per acre, 100 lb., at 1s.		5	0	0
„ ploughing and burning off fire-breaks, four blocks of 20 acres each, with 20 feet roadway between each block, three furrows on each side, at £10 per annum		70	0	0
„ vermin destruction, and unforeseen expenses, say		50	0	0
„ first pruning and thinning at end of second year after sowing, say, 10s. per acre		50	0	0
„ final pruning about fourth year (superficial only), at 5s. per acre		25	0	0
„ interest on seven year's rental	£3 15 0			
„ interest on expenditure, say	£206 10 0			
		210	5	0
„ stripping 100 acres of wattles (1,200 trees to the acre), producing 12 lb. of bark per tree, or 642 tons in all, at 25s. per ton		802	10	0
„ cartage to a railway station, say, 5s. per ton		160	10	0
		£1,514	18	4
RECEIPTS.				
By 100 acres of wattle-bark from 1,200 trees to the acre, each producing 12 lb. of bark—642 tons, £7 10s. per ton		4,815	0	0
Less expenditure		1,514	18	4
Profit		£3,300	1	8

TABLE to aid in the comparison of the more important items contained in the three foregoing estimates.

A.—OUT-GOINGS.

	Victorian Board.	Mr. Brown.	Mr. Perrin.
Cost of land per acre	.....	£3	.....
Rent per acre per annum	6/-	.....	4d. under Wattle Cultivation Bill.
Fencing, per mile	.....	£50	£40
Ploughing	£25	£40	£70 (includes harrowing).
Scarifying, per acre	.....	4/-	.....
Fire breaks	.....	£25	£70 (fuller specification.
Seed and sowing	£37/10/-	£26/10/-	£5 (seed only).
Pruning, &c., per acre	10/-	10/-	10/-
Stripping, per ton	15/-	25/-	25/-
Carting, per ton	10/-	10/-	5/-
Supervision for eight years	£80	.....	.....
Interest on money	£240 (8 years)	£280 (7 years)	£210/5/- (7 years)
Contingencies	£27/10/-	£50	£50

B.—INCOME.

	Victorian Board (*decurrens*).	Mr. Brown (*pycnantha*).	Mr. Perrin (*pycnantha*).
Yield of 5th year trees, each	56 lb.	10 lb. from each tree, admittedly a low estimate.	12 lb.
„ 6th „ „	70 lb.		
„ 7th „ „	84 lb.*		
Value of bark, per ton	£4	£5	£7/10/-
Total yield in tons	1,213 (8 years)	500 (7 years)	642 (7 years)

* Every third tree stripped.

EXTRACTS

"The first shipment of tanning material was made from Sydney to England as far back as 1823, in the shape of an extract of the bark of two species of mimosa (*Acacia*), which was readily purchased by the tanners at the rate of £50 per ton. One ton of bark had produced 4 cwt. of extract of the consistency of tar." (*Science and Commerce*, P. L. Simmonds, p. 541.)

Mr. H. Heaton (*Australian Dictionary of Dates*, p. 267), states that Mr. Thomas Kent "discovered* the virtues of Mimosa bark extract," and received as a reward 10,000 acres of the richest land he could find in Tasmania, 1829.

See also a paper "On the Export and Consumption of Wattle-bark, and the process of Tanning," by James Mitchell (*Proc. R.S. Van Diemen's Land*, 1851). The subject of extracts is here dealt with.

The preparation of extracts causes an immense saving in freight, but an extract is chiefly valuable in that it enables us to utilise everything. The following is an account of a process as carried on in South Australia, and is suggestive :—"Messrs. Barrow and Haycroft have established at Echunga a manufactory of tannage, which, from the methods employed, is almost pharmaceutical. About 10,000 tons of wattle-bark are sent annually from South Australia alone, and it is calculated that the waste in stripping is about four times this amount. The new factory converts the branches, too small to pay for stripping, into a strong fluid extract called tannage, which contains water 60 per cent., and soluble tannin 38.2 per cent., according to an analysis by Mr. G. H. Hodgson of samples from the first 80 tons recently shipped to England. The wattle 'trash' yields 12 to 16 per cent. of tannage. Two men can often cut and load 5 tons, and the waggons can bring in two loads a day, equal to 5 or 6 tons; and at the price (£1 a ton) which the firm is paying for thinnings and tops and branches, so much is offering that the patentees are obliged to distribute their order. The trash is tied up in large bundles and carted into the factory. It is there weighed, close beside the machine which cuts it up into 'chaff.' This machine is very much like an ordinary steam plane, the chisels revolving at a high speed, and cutting through 2½-inch saplings quite readily. The chips are shovelled into large wooden hoppers, into which steam is introduced from a large Cornish boiler. There are three steam-heated vats, and the liquor is transferred from one to the other, pumped into elevated tanks, and thence allowed to flow from a tap on to steam-heated evaporating pans, about 30 or 40 feet in length. The evaporation is so rapid that in traversing the pans from the one end to the other the liquid is converted into a thick, tenacious, treacly extract. At the end of the pans it flows into a cistern, and thence by a kind of treacle-gate into the casks, each of which will hold about 10 cwt. All that now remains to be done is paste on a label, put in a bung, weigh the cask, and send it off to market. In the process of evaporation a certain portion of the tannic acid is destroyed. The plant can be easily moved from place to place. It does not pay to cart the trash far, but a few square miles of wattle country will keep a factory going. The utilisation of thinnings allows the cultivation of the tree thickly on waste ground, and to begin cutting the third year. European tanners are quite accustomed to the use of such extracts, but it is said that it will be very hard to introduce it into the colonial tanneries."—(*Chemist and Druggist*, 1886.)

* This is doubtful. Wattle-bark extract is several times alluded to as an ordinary article of commerce in P. Cunningham's "Two years in New South Wales." published in 1827.

These works are still in successful operation,* although mucilage still gives some trouble. Wattle twigs are rich in gum and mucilage, and some cheap process, which will get rid of these substances and leave the tannic acid uninjured, is a desideratum.

I have received many inquiries as to whether the difficulty has been overcome, but I have had to reply in the negative, as far as a commercial process is concerned. There is very little gum in clean-grown bark, but far more in chopped twigs; extract will not be made from the former except in almost inaccessible districts.

The key to the difficulty of getting rid of the superfluous gum in extracts lies, in my opinion, in the judicious use of alcohol, which can be recondensed and largely saved. Arrangements might be made, if necessary, for constituting each extract works a bond, and using duty-free spirit.

Of course, the extract in all stages of its manufacture must be preserved from contact with iron. Wooden vats are employed, and the heat for evaporation is obtained from hot water or steam. The waste bark, chips, &c., used in the preparation of the extract are first digested in cold water, and by having a series of vats, with communicating tubes or siphons, a charge of bark can be transferred from one to another until it is exhausted to such an extent that the small remaining percentage of tannic acid can only be removed by hot water.

The vats are constructed so as to expose a maximum of evaporating surface to the atmosphere, and if the evaporation can be carried on wholly or in part by means of the heat of the sun, so much the better, firstly, because the consumption of fuel will be minimised, and secondly, because the process should be conducted at as low a temperature as convenient.

The preparation of wattle-bark extract has been attempted in all of the States, but in only one has it passed the experimental stage, so far as I know. The process is analogous to "concentration" in metallurgical operations, for the tannic acid is bulky, unsaleable material can be highly concentrated, and barks weak in tannic acid can be utilised for the same reason. The industry of extract-making is tempting, and I am confident that there is much money in it for some of our country districts whose circumstances are favourable. I trust, therefore, that it will soon be the means of affording profitable occupation to many people.

The dark colour of extracts is an objection, and many experiments have been undertaken with the view to minimise the evil, with no very satisfactory results up to the present. Nothing is easier than to decolourise extract, but the difficulty is not to destroy the tannic acid at the same time.

The following notes relating to the making of extract of hemlock-bark are taken from Proctor's "Text-book of Tanning," and may be suggestive :—

"The bark, in pieces ½—1 inch thick and several inches long, is soaked for about fifteen minutes in water at 200 degrees F. (93 degrees C.); it is then fed into a hopper, which conducts it to a 3-roller machine, something like a sugar-cane mill, through which it passes, coming out lacerated and compressed; it next falls into a vat of hot water, where it is agitated by a wheel that the tannin from the crushed cells may be dissolved in the water, hence it is raised by a series of buckets on an endless chain, somewhat in the manner of a grain elevator to another hopper, whence it is fed to another 3-roller mill; here it receives its final compression, and comes out in flakes or sheets, like coarse paper, and almost free from tannin. The buckets are made of coarse wire that the water may drip through during elevation. In order to avoid the blackening action of iron,

* I regret to say this is no longer the case.

whenever this metal will come into contact with the solutions it is thickly coated with zinc. The solution is evaporated to a solid consistency, generally by vacuum-pans. About 2 tons of bark are represented by 1 barrel (of less than 500 lb.) of extract."

And, again—

"It is one of the great attractions of extracts that they avoid almost all the expense and labour inseparable from the exhaustion of other tanning materials. It is usually necessary to dissolve the fluid extracts in water or liquor of as high a temperature as has been employed in their preparation, as otherwise, from some unexplained chemical change, a large portion of the tannin is precipitated, probably as an anhydride of tannin."

A South Coast correspondent informs me that he has obtained 1 ton of extract, 40 *per cent.*, from 4 tons of hickory or black-wattle bark (*Acacia penninervis*). There is now a good market in Europe for well-prepared wattle-bark extract, but the demand has only sprung up again within the last few years.

The following notes on extracts from the Moruya district, examined by me, may be interesting :—

1. Hickory extract (*Acacia penninervis*), of the consistency of thin treacle, contains only 20·25 per cent. of tannic acid, 61·15 per cent. of water, and 8·2 per cent. of gum precipitated by alcohol after twenty-four hours. The phlobaphenes and other organic substances were not estimated. Damaged by over-heating and over-concentration.
2. Hickory extract (dry) forming a blackish powder having a "burnt" smell. Wholly soluble, but not without heating slightly; it remained twenty-four hours in cold water without entirely dissolving. It yielded 41·5 per cent. of tannic acid, and 17·1 per cent. of moisture, but the destruction of tannic acid must have been very great, and there is no necessity to go into the manufacture of dry extracts until the preparation of the easier wet extracts is on a better footing.
3. Green wattle extract (*Acacia decurrens*) dry. Wholly soluble in cold water in a short time, contains 40·5 per cent. of tannic acid, and 15·7 per cent. of water.

A Queensland correspondent took *Acacia harpophylla bark* (found to contain 11·59 per cent. of tannic acid). He converted it into extract of specific gravity 1·281, the percentage then being increased to 33·82. He found that 5·81 parts of bark were required to make one of extract.

We want a little more enterprise in this matter of extract making. Extracts for tanning are thoroughly well known in the trade, are made in enormous quantities in America and Europe, and in small quantities in, at least, three Australian States. The advantages of an extract are mainly two,—uniformity of product and saving of carriage. What is the sense of conveying, perhaps thousands of miles, large and varying percentages of unnecessary ligneous matter? The potentialities of wattle-bark extracts are enormous, and what are the difficulties? Surely to the practical man, determined to surmount them, by no means insuperable. The wood of the stripped trees, and the exhausted "trash" are available for fuel, while the evaporation can be pushed as far as expedient in vacuum pans which, owing to the vicissitudes of the sugar-industry, can now be obtained at a low rate.

WATTLE FOLIAGE FOR TANNAGE.

(To the Editor of the *Evening News*.)

Sir,—Having had sixty years' colonial experience, a great deal of that time engaged in the leather trade, I have always been impressed with the idea that the foliage of the wattle possesses the same tannage qualities as the bark. If such is the case we are losing

thousands of tons per annum, which could be forwarded to market in bags or bales, or it might be reduced to a liquor of a given strength so as to be saleable. It appears to be a waste to use the bark only, especially if other portions of the tree can be made available.
24th March, 1891. J. R. FENWICK.

The matter is worthy of experiment, but I imagine that leaves will only be used for extract-making in conjunction with the thin branches.

TECHNICAL EDUCATION IN LEATHER AND TANNING MATERIALS.

The problem of extract-making is one which should be settled by practical experiment. I hope at no distant date to see a Department of Leather and Tanning established at our Technical College, on the same lines, if necessarily on a smaller scale, as the successful Department at the Yorkshire College of Science at Leeds. It should be equipped with the necessary appliances for research with tanning materials and other matters connected with the leather industry.

The University of Leeds, Department of Leather Industries, has a professor, assistant-lecturer, and a demonstrator.

At the University there are lime and tan houses, a dye-house, currying-shop, drying rooms and a Museum.

The lecture courses comprise :—

(*a*) The general principles of leather manufacture.
(*b*) The chemistry and physics of leather manufacture.
(*c*) Leather dyeing, staining, and finishing.
(*d*) Currying and leather finishing.
(*e*) Technical microscopy and bacteriology in leather manufacture.

We produce hides and skins of first class quality, and tanning materials second to none in the world, and yet we hear disparaging statements in regard to the quality of our leather, while the bark industry is, to say the least, in an unsatisfactory condition.

The question of extracts requires earnest attention, and altogether there seems no reason why technical education properly directed in regard to these industries should not be a very great success.

The present writer was successful in establishing classes for instruction in wool at the Technical College, in face of much discouragement. No one ventures to say now that these classes are not of high value to Australians. Is is now time for leather industries and tanning materials to be taken up in the same practical and thorough manner. For instruction on a commercial scale the fellmongering establishments and tanneries at Botany could be utilized.

WATTLE-GALLS.

Galls, of course, play an important part in tanning, particularly in European countries ; but it does not appear that wattle-galls are likely to be of any commercial importance. On some wattles, and particularly when they are growing in uncongenial surroundings, or suffering from senile decay, galls are very abundant, but usually they are of irregular shape (unlike oak-galls), and are dark-coloured and friable after the insect has made its escape. Following are analyses of two species, for reference :—*Acacia binervata* (Illawarra, New South Wales), 8 per cent. of tannic acid, and 21·75 per cent. of extract ; *Acacia decurrens*, var. *dealbata* (Braidwood district, New South Wales), 3 per cent. of tannic acid, and 13·6 per cent. of extract.

WATTLE-GUMS.

Wattle-gum is the produce of various species of wattle. Gum has, however, only been recorded from comparatively few species, as by far the great majority have no local names, and where it has been collected at all it has been simply known as "Wattle-gum." Best selected Turkey gum arabic is the ideal gum of the group to which wattle-gum belongs, and if judging were to be by points, it would take the highest place as regards absence of colour, freedom from accidental impurities, ready solubility, and adhesiveness of mucilage. Our wattle-gums as a rule fall far behind this high standard, although specimens of yarran, myall, and prickly wattle (*Acacia sentis*) gum compare with it very favourably. As far as my observations go, those samples obtained from the interior (comparable in its aridity to the Soudan and other gum-producing countries) are completely soluble in water, and make good mucilages, while those obtained east of the Dividing Range, *i.e.*, in well-watered districts, in which vegetation is comparatively luxuriant, are more or less insoluble, portions at least merely swelling up in water like cherry gum.

Australian Wattle-gum (chiefly, however, from the other States) frequently finds its way into the London market, and may often be seen noted in the drug sales. Following are a few extracts from London market reports (auction sales), none of them, however, referring to the best wattle-gum :—

"Of 71 bags Australian only 7 bags sold at 32s. 6d. per cwt. for fine frosted palish." (April, 1895).

"Of Australian gums a considerable quantity (239 packages), including some nice lots, was offered, but only 8 packages ordinary to common glassy red sold at 21s. 6d. to 23s. per cwt." (June, 1895.)

"The market was rather quiet for most varieties, several lots being held above current value. The only kind which sold with really good competition at full price was Australian gum, which appears to be wanted for Russia. The following is the result of the auctions :—'Australian, of 295 packages, 180 sold at 31s. to 33s. for bold, partly woody mixed red ; 27s. 6d. for frosted reddish ; 26s. 6d. to 27s. for ordinary quality red ; and 20s. for siftings.'" (October, 1895.)

"Good, bright glassy to fine bold frosted Australian sold at 27s. to 33s. per cwt." (November, 1895.)

I would, therefore, earnestly recommend dwellers in the drier parts of the country, where there are wattles, to look after the gum, and carefully collect it. I would also include such trees as the leopard tree (*Flindersia maculosa*), which yields a gum arabic of excellent quality.

If a man were to set out with the deliberate intention of collecting wattle-gum, what with its capricious exudation, and the uncertainty of an odd shower washing it from the trees, he might find his undertaking unprofitable ; but in this, as in the collection of other of our minor bush products, children and others should be apprised of the value of these gums, and whenever an opportunity presents itself of collecting them it should not be lost. If a permanent resident of a district be on the lookout for such a product, depend upon it, not much will be lost in the course of a year. If kept dry and clean it does not deteriorate on keeping, and it can be accumulated until a convenient opportunity of disposing of it presents itself. In spite of the various gum substitutes, there will always be a demand for wattle-gum, particularly for the finer sorts.

Those interested in this subject are referred to my paper in the *Pharmaceutical Journal* of London for the year 1890 (*Pharm. Journ.* [3] xx, 869 and 980), entitled "The Chemistry and Commercial Possibilities of Wattle-gum," in which the subject is discussed from a botanical, chemical, and commercial stand point. More up-to-date work will be found in the papers by Dr. Greig Smith on the bacterial origin of gums, in the Proceedings of the Linnean Society of New South Wales.

My paper is so comprehensive that it will be sufficient to add a few supplementary notes. Probably the best modern analysis of a Wattle-gum is that by Winthrop E. Stone of *A. decurrens.*

Wattle-gum undoubtedly possesses nutritive properties. According to Wilhelmi, the Port Adelaide tribes lived almost exclusively during the summer months on the gum obtained from different *Acacias*, and the same was true of other tribes.

The following extract from the *Sydney Morning Herald* of the 24th March, 1891, is to the point :—"Albury, Monday.—A little boy named Finch, who was lost on the 15th instant, was recovered yesterday by a black tracker engaged from Benalla. The child seemed thin, but was otherwise not much the worse for his eight days in the bush. He was found 10 miles from home, and said he had lived on wattle-gum. Over 400 people had been in search of the boy all the week, and were just on the point of abandoning their pursuit as useless."

For a brief description of wattle-gum see *Pharm. Journ.* [3], xx, 719.

Cherry-tree Gum is in Europe rendered soluble and decolourised by the addition of sulphuric acid (see *Pharm. Journ.*, 29th Oct., 1892), and similar treatment may be applied to some of our less soluble wattle-gums.

WATTLES AS DRUGS.

The barks of all wattles are more or less astringent, and are used in domestic medicine to make decoctions or infusions employed in diarrhœa or dysentery, perspiring feet, some affections of the eyes, and a number of severe and trifling ailments in which an astringent may or may not be of service.

The medicinal properties of these barks are discussed in a paper by Dr. S. J. Margarey on *A. pycnantha*, in *Trans. R.S., South Australia*, iii, xiv.

The gums of some species of wattle are used to a limited extent in domestic medicine.

I may mention here, as a most interesting fact, that the bark of *Acacia tenerrima*, Jungh., of Asia, contains a bitter poisonous alkaloid, readily soluble in ether and chloroform. No alkaloid has been previously found in an Acacia. (Greshoff in *Ber.*, xxiii, 3537 ; *Journ. Chem. Soc.*, lx, 336).

I would at this place invite attention to my article on the "Fish-poisons of the Australian Aborigines" in the *Agric. Gazette* for 1894, p. 470 (July) ; where advantage is taken of the saponin as well as the tannin in certain wattle-barks used for the purpose.

WATTLE-BLOSSOM.

Bees do well in the neighbourhood of wattle-blossoms ; an additional reason why these beautiful trees and shrubs should be cultivated. I would emphasise the plea for the cultivation of these beautiful plants on æsthetic grounds. Besides their use as honey-yielders, many of them, *i.e.*, *A. decurrens*, var. *mollis*, *pruinosa*, *suaveolens*, *pycnantha*, *pubescens*, yield a delicious perfume, which may, some day, be put to commercial use.

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PART II.

The best New South Wales Wattle-barks.

THE *ACACIA DECURRENS* GROUP OF WATTLES.

THE well-known feathery-leaved wattle, familiar to most people in the eastern and southern States—by whom it is chiefly known by one of two names, viz., Black or Green Wattle—was first botanically described by the botanist Willdenow, who defined two species, *Acacia decurrens* and *Acacia mollissima.*

In the Flora Australiensis, Bentham took Willdenow's *decurrens* as the typical species, reducing the other species to the rank of a variety under the name of *mollis*; in other words, *Acacia mollissima*, Willd., is *Acacia decurrens*, Willd., var. *mollis*, Benth. Bentham also called a certain form variety *normalis*, a third one *pauciglandulosa*, and a fourth (doubtfully) *Leichhardtii.*

In Mueller's "Dichotomous key to Victorian plants," he looked upon *decurrens* and *mollissima* as distinct species.

I go further than Bentham, and reduce *A. dealbata*, Link, to a variety of *decurrens*. I will produce evidence for this step presently.

These four varieties appear at first sight to be more or less well defined; but, after examination of some hundreds of specimens, I incline to the opinion that they all pass into one another, and the *mollis* variety (in my view) has no more claim to specific rank than has *pauciglandulosa.*

In stating this, I am aware I am but endorsing Bentham's words: "The following forms appear at first sight very distinct, but pass into each other by many gradations."

Following are the points, stated briefly, on which I base my opinion:—

1st. The pinnules of all vary more or less in each variety in length, breadth, and insertion.
2nd. A decurrence of leaf stalks is common to all.
3rd. Nothing is constant in times of flowering.
4th. The indumentum is variable.
5th. Seed. The microscope fails to detect any marked difference.
6th. The number of glands vary in each variety in the same tree.

We will now discuss the several varieties:—

a. The typical form. The var. *normalis* of Bentham.
b. var. *mollis*, Lindl. (*A. mollissima*, Willd.).
c. var. *pauciglandulosa*, F.v.M.
d. var. *Leichhardtii*, Benth. (*A. Arundelliana*, Bailey).
e. var. *dealbata*, F.v.M. (*A. dealbata*, Link).
f. var. *lanigera*, var. nov.

a. var. *normalis*, Benth.—It is the form figured in this work. See also figures by Turner in *Agric. Gaz.*, N.S.W., ii, 1901; Maiden and Campbell, *Flowering Plants and Ferns*, No. 13 (Sydney).

"Glabrous, or the young shoots slightly tomentose-pubescent. Leaflets long and narrow, usually 3 to 4 lines; glands numerous along the primary rhachis." (B. Fl., ii, 415.)

Local Names.—The "Black Wattle" of the Sydney district (N.B.—Australians are not always unanimous in the use of the terms Black and Green Wattle in regard to varieties of *A. decurrens*.)

"Sydney Wattle," the common black wattle of the older colonists, formerly known as "Book-kerriking" by the aborigines of the counties of Cumberland and Camden (Macarthur).

New South Wales.—Apparently confined to this State, and restricted to the neighbourhood of Sydney, *i.e.*, a few miles to the north, and less than 150 miles to the south. It is a winter flowerer.

A coast and coast-mountain variety, chiefly about Port Jackson, Campbelltown, Picton, and Bargo Brush, Berrima to Wollondilly, to Goulburn and Taralga.

A not very good specimen from Campbelltown, stripped in August, yielded 31·5 per cent. of tannic acid, and 57·35 per cent. of extract.

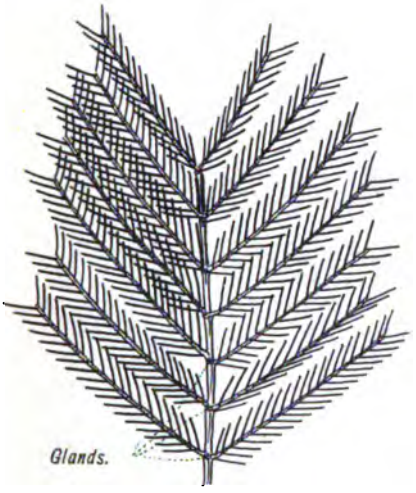
A specimen from Ryde, near Sydney, yielded 32·33 per cent. of tannic acid, and 48·74 per cent. of extract. (*Proc. R.S., N.S.W.*, 1887, p. 93.)

b. var. *mollis*, Lindl.—*Bot. Reg.*, t. 371; Engler. *Nat. Pflanzen.*, iii, 3, p. 109, fig. 64; Sweet, *Fl. Austr.*, t. 12, as *A. mollissima*; J. E. Brown's *Forest Flora of S.A.*, t. 26. Perhaps also Vent. *Jard. Malm.*, t. 61, which I have not seen. (*A. mollissima*, Willd.)

"Bot. Reg., t. 371. Folliage softy tomentose-pubescent, the indumentum assuming a golden-yellow tinge on the young shoots. Leaflets 2 to 3 lines long, obtuse; glands numerous along the primary rhachis.—*A. mollissima*. Willd. *Enum*, 1,053; DC. Prod. ii, 470; Sweet, *Fl. Austral.*, t. 12; Hook. f., *Fl. Tasm.*, i, 117. The only form in Tasmania, and the most common one in Victoria; less frequent in the northern districts of New South Wales." (B.Fl. ii, 415.)

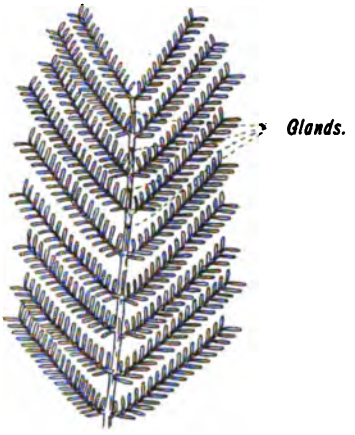
ACACIA DECURRENS.
SYDNEY BLACK WATTLE.

UNIV. OF MICH.



Section.

normalis.

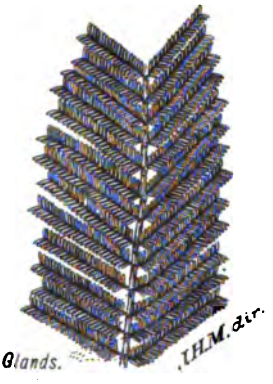


Section.

Leichhardtii.

Section.

pauciglandulosa.



Section.

mollis.

FOLIAGE OF VARIETIES OF ACACIA DECURRENS.

UNIV. OF

The pods are usually constricted between the seeds.

The leaflets are nearly spathulate and besprinkled with fine hairs. Sometimes they are entirely covered with fine hairs, and then they approximate to var. *dealbata*. Sometimes the leaflets are nearly glabrous.

This is a sweet-scented, almost overpoweringly scented form, and it flowers in the summer, or early summer. It is the form which yields the best tan-bark. At the same time it passes imperceptibly into other forms, and I advise landowners not only to have a botanical examination of their wattles, but also to have a chemical examination of their barks.

Sometimes called "Black Wattle" in New South Wales, and commonly so called in Victoria and Tasmania, but usually called "Green Wattle" in New South Wales, and occasionally "Silver Wattle." The common Green Wattle of the older colonists, formerly called "Wat-tah" by the aborigines of the counties of Cumberland and Camden, New South Wales (Macarthur); "Garrong" of some aborigines of Victoria; and "Warraworup" by those at the aboriginal station, Coranderrk, Victoria.

The only form in Tasmania, and the most common one in Victoria; less frequent in the northern districts of New South Wales.

Queensland.—Inland, extra tropical Queensland.

South Australia.—South of the Murray Desert, embracing the 90-Mile Desert and the Tatiara, Mount Gambier District.

In New South Wales this variety flourishes best in the colder districts of this State, chiefly on the southern tablelands, but is by no means confined to the colder districts, as the following specimens in Nat. Herb., Sydney, show:—

Cooma, E.B.;* Mogo, near Moruya, "Green Wattle, *the* tan-bark," W.B.; Tallwong, W.F.; Marulan, J.H.M.; Hill Top, J.H.M. and J.L.B.; National Park, J.H.C.; Parramatta (examined by Bentham); Wahroonga, Sydney, J.H.M. It is apparently not common in northern New South Wales, *e.g.*—Warialda—Pods nearly glabrous. Leaflets more spathulate than var. *pauciglandulosa*, and not hairy on the tips, H.M.R.R.; Warialda—More glabrous than the preceding, and further remote from var. *pauciglandulosa*, J.H.M. and J.L.B.; Warialda—Nearer the *pauciglandulosa* type, but glands abundant, J.H.M. and J.L.B.; Inverell.—Almost entirely glabrous, J.H.M. and J.L.B.

These northern specimens alone show that vars. *mollis* and *pauciglandulosa* run into each other.

Out West the variety becomes more stunted, but otherwise nearly normal. Fine short golden hairs sometimes extend lower than the tips of the branches. Minore, J.L.B.; Peak Hill, R.H.C.; Condobolin Hill, J.H.M.; Coolabah, J.H.M., J.L.B.; Nymagee, J.W.C.

Sometimes the leaflets become entirely glabrous, with a few short hairs on the rhachis, further apart, longer and narrower—*e.g.*, Wagga Wagga, J.H.M., R.H.; Gulgong, leaflets further apart as regards the lower portion of the branchlets, J.H.M. and J.L.B.

Then we have many western forms which display unmistakeable transit to *A. Muelleriana*, Maiden and Baker, with its glabrous, long, comparatively broad leaflets, small flower-heads, and flat, glabrous pods. For example, Harvey Range, J.H.M. and J.L.B.; Minore, J.L.B. Specimens from Lue, Mudgee district (Miss Liddle), with the leaflets wide apart, and Yarrowitch

* See a list of these initials below, p. 62.

to Tia, New England (J.H.M.), certainly bear affinity to *A. Muelleriana*, but are, perhaps, even closer to var. *normalis* than to var. *mollis*. These and other forms cannot be clearly defined without figures.

I now proceed to give brief descriptions, with analyses, of illustrative samples of this bark, and for practical convenience I divide those of New South Wales into southern and northern localities, taking the Hawkesbury River as a natural boundary.

Southern Barks.

A sample of a smooth green bark from a young tree afforded 33·5 per cent. of tannic acid, and 61·85 per cent. of extract, while a second sample, from an older tree, gave 35·3 per cent. of tannic acid, and 59·05 per cent. of extract. Both were grown near Penrith, New South Wales.

A black bark, slightly rugged, from Mulgoa, Penrith, gave 35·56 per cent. of tannic acid, and 59·2 per cent. of extract. It was known locally as "Green Wattle."

A sample received May, 1890, and analysed the following month, was found to contain 34·85 per cent. of tannic acid and 61·5 of extract. It came from Burragorang. It is thicker than most barks of this species, and is beginning to be scaly on the outside. Were it not for that defect it would be a splendid bark. It was allowed to remain a year too long on the tree, a fault not usually to be found with bark-getters.

Another sample taken from a tree between 40 and 50 feet high and 15 inches in diameter, at a place 12 miles from Burragorang Mountain, where this species was growing in very large quantities, was analysed July, 1890, and found to contain 34·4 per cent. of tannic acid, and 69·33 per cent. of extract. This is a perfect specimen of bark of this species, being of good thickness, smooth, and of good colour.

A sample from Cambewarra, from trees 20 to 30 feet in height, and 6 to 8 inches in diameter, gathered in August, 1886, was found to contain 32·08 per cent. of tannic acid, and 52·16 per cent. of extract. (*Proc. R.S., N.S.W.*, 1887, p. 33.) A bark grown in the same neighbourhood, and analysed in April, 1890, gave only 24·13 per cent. of tannic acid, and 47·1 per cent. of extract. It is a smooth bark, but from a young tree, being only ⅛ of an inch thick, and rather fibrous. Had it been allowed to remain on the tree a couple of years longer, I feel sure that the percentage of tannic acid would have much increased.

A sample from Nerriga (on the high table-land from Nowra to Braidwood), gave the excellent result of 36·3 per cent. of tannic acid, with 62·54 per cent. of extract. (*Proc. R.S., N.S.W.*, 1888, p. 271.) Height of tree, 15 to 20 feet; diameter, 8 to 12 inches. It was stripped in January, and analysed the following August. This is the best sample of *A. decurrens* bark which has hitherto been examined by me.

A second sample from the same district yielded 31·75 per cent. of tannic acid, and 62·35 per cent. of extract; while a third gave 29·25 per cent. of tannic acid, and 59 per cent. of extract. A fourth gave 24·99 per cent. of tannic acid, and 53·96 per cent. of extract.

A bark from Bateman's Bay, collected in February, and said to be known locally as "Silver Wattle,"* yielded the very satisfactory result of 34 per cent. of tannic acid, and 59·45 per cent. of extract. It was obtained from trees 50 feet high and 9 inches in diameter.

* It is sometimes difficult to tell this tree from the true Silver Wattle (var. *dealbata*), but usually they are different enough.

A second specimen from the same locality, collected at the same time, and labelled, probably more correctly, "Green Wattle," gave the even better result of 36·25 per cent. of tannic acid, and 60·3 per cent. of extract. It is as good as any Victorian or Tasmanian.

Mr. Thomas Shepherd, an enterprising tanner of Cambewarra, has kindly furnished me with the following information in sending the first sample from Nerriga. Of all New South Wales localities he prefers Nerriga for *A. decurrens* bark. He says it would be quite equal to Tasmanian if it could be obtained as finely ground. From Cambewarra bark Mr. Shepherd obtains only two liquors, of which the second is very weak, while from the Nerriga bark he invariably obtains three strong liquors. In his opinion the best time for stripping is when the trees are in bud, and have just come into flower. Next to the Nerriga bark he speaks highest of that coming from the Bega District.

I have examined a sample of bark called "Green Wattle," from Bell's Creek, Araluen, N.S.W. It was from trees 25 to 30 feet high, with diameters from 6 to 18 inches, was grown on granite soil, and was collected in November, 1888. In April, 1890, it was analysed with the following result:—Tannic acid, 31·23 per cent.; extract, 64·15 per cent. It is smooth, compact, yields a light-coloured powder with some fibre, is a quarter of an inch thick, and is to ranked with the best of our New South Wales barks.

Bark from Eden, stripped in November, gave 30·25 per cent. of tannic acid, and 51·65 per cent. of extract.

A specimen of "Green Wattle-bark," grown at Tombong, Snowy River, N.S.W., was collected in March, 1889. It was obtained from trees 20 to 30 feet high, with diameters 6 to 15 inches, and was grown in granite country. It yielded (April, 1890) 24·63 per cent. of tannic acid, with 45·8 per cent. of extract. This sample is hardly fair to the species. It is rather thin, rugged, covered with lichens, and rather more fibrous than the generality of barks of this variety. In spite of the badly-selected sample, the analysis shows that it is full of promise.

Northern Barks.

Bark from Booral, stripped in June, yielded 28·52 per cent. of tannic acid, and 56·1 per cent. of extract. A second sample from the same place, gave 27·5 per cent. of tannic acid, and 57·1 per cent. of extract.

A sample from Raymond Terrace, collected in December, gave 33·20 per cent. of tannic acid, and 56·5 per cent. of extract, showing that good barks can come from the north.

Bark from Gosford, stripped in July, from four-year-old trees, gave 22 per cent. of tannic acid, and 46·4 per cent of extract.

We now turn to the other States. Following are two barks from Casterton, Victoria, stripped in January, and analysed in the following March. A picked specimen, said to be the best obtainable, gave the excellent result of 36·25 per cent. of tannic acid, and 61·65 per cent. of extract, practically the same as that of the Nerriga, New South Wales, bark, already noted.

A second specimen of the same district, sent as an average sample, gave 29 per cent. of tannic acid, and 54·45 per cent. of extract.

The following analysis of a Queensland sample, was given by the Commissioners of that State at the Colonial and Indian Exhibition of 1886:—Tannin, 15·08 per cent.; extract, 26·78 per cent. This bark becomes undoubtedly inferior in the warmer climate of Queensland.

c. var. *pauciglandulosa*, F.v.M.—A "Green Wattle."

"Pubescent, but not so softly so as in the var. *mollis*, and sometimes almost hirsute, with the same golden yellow tinge on the young shoots. Leaflets small, often under 2 lines; glands few, often under only the last 1 or 2 pairs of pinnæ. New England, Clarence, and Hastings Rivers, Moreton Bay, &c., also between Archer's and McKenzie's stations in moist places. *Leichhardt.*"—(B.Fl. ii, 415.)

I do not think that this is a strong variety. It runs into var. *mollis* too much. Typical var. *mollis* has more spathulate leaflets than has var. *pauciglandulosa*, and the plant is more angular, and altogether more hairy, and even some times scabrous. The fine leaflets are sometimes tipped with hairs. I find the number of glands an uncertain character. Its young tips are decidedly, and more extensively, golden than var. *mollis*. The young pods are also yellowish.

So far as our specimens are concerned it may be looked upon as a northern New South Wales and southern Queensland form. That is to say, it hardly comes south of Sydney.

It also extends to the table-land. Specific localities are :—Gosford, W.W.F.; Port Stephens, W.W.; Booral, A.R.; Stewart's Brook, J.H.M.; Brushy Mountain, Gloucester, J.H.M.; Taree (J.H.); Hastings River (Dr. H.B.); Upper Hastings River, J.H.M.; Bellingen, W.M.; Bolivia, J.V.; Wallangarra, J.L.B.; Rous, Richmond River, W.B.; Acacia Creek, Macpherson Range, W.D.

Under var. *mollis*, Benth. (B.Fl. ii, 415) has the note "Some of Beckler's specimens from Warwick have the numerous glands of this form with the very small leaflets of the following (*pauciglandulosa*)."

I have a specimen of Beckler's before me, also Narrabri, on sand-ridges, E.B.; Woolooma Mountain, Belltrees, Scone, H.L.W. They seem to me nearest to var. *pauciglandulosa*, and are evidence of the statement I have previously made that vars. *mollis* and *pauciglandulosa* run into each other.

A specimen of bark from Port Stephens, N.S.W., stripped in December, yielded 31·75 per cent. of tannic acid and 51·55 per cent. of extract.

A sample from Bateman's Bay, N.S.W., stripped in February from trees 30 feet high and up to 15 inches in diameter, gave the result of 27 per cent. of tannic acid and 53·45 per cent. of extract.

d. var. *Leichhardtii*, Benth. (*A. Arundelliana*, Bailey). "A Green Wattle."

"More or less hirsute, with spreading hairs. Leaflets small, narrow; glands few.—Between Archer's Station and Biron, and towards the Bunya, *Leichhardt*. This seems to connect in some measure *A. decurrens* with *A. pubescens*, but it has the numerous pinnæ of the former."—(B.Fl. ii, 415.)

This might be described as an extreme form of var. *pauciglandulosa*. It resembles it strongly in general appearance, but has a profusion of comparatively long, weak hairs, particularly on the rhachises, which give it a rather ornamental aspect. The leaflets have, however, fewer hairs than var. *pauciglandulosa*.

This form is best developed in South Queensland, and Bailey constitutes it a species under the name of *A. Arundelliana*. I certainly cannot follow him. It is impossible to separate it from var. *pauciglandulosa*. For example, the form common on the South Coast, *e.g.*, Yalwal and Nelligen (W.B.) and Cockwhy Creek (J.H.M.). Another transit form is Tenterfield to Sandy Flat, near the Queensland border. "Green Wattle, superior as tan bark to Black." (J.H.M.) It may be looked upon as var. *pauciglandulosa* with long hairs, or var. *Leichhardtii* as var. *pauciglandulosa* with short ones. It certainly is not a species distinct from *A. decurrens*.

Queensland.—Between Archer's Station and Biron and towards the Bunya (Leichhardt), Maroochie.

New South Wales.—Mogo, Moruya, Nelligen, Bateman's Bay. Found also in the Monaro and Braidwood districts and in the Jingera Mountains.

The bark of this variety is used by the local tanners, and is spoken of fairly well as regards percentage of tannin, but is not much liked on account of its being considered too hard and fibrous, and therefore difficult to break up in the mill.

It is a common belief amongst tanners (and at present I am not prepared to say what basis of truth it has), that barks much subjected to frost and snow are much richer in tannin than those not so subjected. The present sample is from a tree grown in a very cold district. It was collected October, 1888, at Monga, from trees 20 to 25 feet high, and 6 to 18 inches in diameter, growing on granite soil. Thickness of bark about $\frac{3}{16}$ inch. A smoothish bark of a light colour, but forming a rather fibrous powder. It was analysed April, 1890, and found to contain 26·4 per cent. of tannic acid and 45·25 per cent. of extract.

This variety would appear to attain exceptional dimensions at Yalwal, not far from Nowra, as I have been informed that trees in that locality have been stripped of the following diameters, viz. :—9, 12, 18, and 36 inches. The last diameter is certainly extraordinary, and I have not heard of authentic measurements of any variety of *Acacia decurrens* giving over 24 to 30 inches, and then only in exceptionally favourable localities; but my information appears to be quite reliable, and I have heard from another source of the immense size of the trees in this locality. The bark is not less than 1 inch thick, and must have come from a huge wattle. It is scaly on the outside, and reminds one of mountain hickory bark (*A. penninervis*). It was stripped in March and analysed the same month, with the result of 29·25 per cent. of tannic acid and 46·75 per cent. of extract. A second specimen from a tree 18 inches in diameter gave 25·75 per cent. of tannic acid and 40·8 per cent. of extract. A third specimen from a tree 9 inches in diameter gave 26 per cent. of tannic acid and 44·05 per cent. of extract.

A poor, thin, too-early stripped specimen (near the type) from Tewantin, Queensland, stripped in July and analysed in September, gave 22·1 per cent. of tannic acid and 41·6 per cent. of extract.

e. var. *dealbata*, F.v.M.* (*A. dealbata*, Link); Lodd., *Bot. Cab.*, t. 1928; Knowl. et Westc. 103.—The commonest "Silver Wattle."

"A handsome tree, closely resembling the var. *mollis* of *A. decurrens*, and to be added, perhaps, to the varieties of that species as proposed by F. Mueller, but the branches and foliage are very glaucous or hoary with a minute pubescence not assuming a golden tinge on the young shoots. Pinnæ, usually 10 to 20 pairs; leaflets, 30 to 40 pairs; linear, crowded, 2 to 3 lines long; glands usually numerous. Flower-heads small, in axillary racemes paniculate at the ends of branches, as in *A. decurrens*. Pod broader, not contracted between the seeds, and more glaucous.—DC., *Prod.* ii, 470; Lodd., *Bot. Cab.*, t. 1928; Hook. f., *Fl. Tasm.*, i, 111; *A. irrorata*, Sieb. in *Spreng. Syst.*, iii, 141."—(B.Fl. ii, 415.)

* I attribute this variety to Mueller on Bentham's evidence (B.Fl. ii, 415), "*A. dealbata* . . . to be added, perhaps, to the varieties of that species as proposed by F. Mueller. . . . This, the 'Silver Wattle' of the colonists, is unhesitatingly united with *A. decurrens* by F. Mueller." At the same time I do not know where he established the var. *dealbata*, and of late years, *e.g.*, in his "Census," and also his "Key to the System of Victorian Plants," he looked upon *A. dealbata* as a species.

Var. *dealbata* may be looked upon as an extreme form of *mollis*. The indumentum is usually greater (more compact, with shorter hairs) than in *A. mollis*, but of the same character. It should also be borne in mind that the young tips are sometimes distinctly yellowish.

The fruits also are often distinctly constricted between the seeds, *but usually only when quite ripe.*

Where var. *dealbata* and var. *mollis* occur in the same district, the former prefers the river banks and valleys, and the latter the mountain slopes.

The "Silver Wattle" is found in Tasmania, Victoria, New South Wales, and a not strictly typical form occurs in the extreme south of Queensland.

New South Wales—Southern localities (in Nat. Herb., Syd.).—Jindabyne, Snowy River, J.H.M. and W.F.; Tumut, J.H.M. and J.L.B.; McLachlan River, Nimitybelle to Tantawanglo Mountain, J.H.M.; Barber's Creek, H.J.R.; Wingello, J.L.B.; Berrima, J.H.M.; 15-16 mile post, Wombeyan Caves to Taralga, J.H.M. and R.H.C; Queanbeyan. With a yellowish indumentum, and certainly constricted between the seeds. The indumentum in this variety may sometimes be very sparse, and sometimes consist of a glaucous covering.

Western localities.—Mt. King George, with bright yellow tips, J.G.; Jenolan Caves, W.F.B.; Kerr's Creek, Orange, J.M.; Parkes Water Supply, J.H.M.

Northern localities.—Acacia Creek, Macpherson Range, near var. *mollis*, W.D.; Apsley Falls, W.F. and E.C.; Stewart's Brook, showing transit to var. *pauciglandulosa*, J.H.M.

Some specimens of bark from Quiedong, Bombala, N.S.W., yielded the author 21·22 per cent. of tannic acid and 39·86 per cent. of extract. They were from trees 12 to 18 inches in diameter and 20 to 30 feet high, and were grown on limestone country (*Proc. R.S., N.S.W.*, 1887, p. 92). A second sample from the same district gave 17·1 per cent. of tannic acid and 39·3 per cent. of extract. They were apparently from an old tree. The barks form a rather fibrous powder.

I have examined a sample from the Delegate River, N.S.W., where the trees are growing in the brush (rich jungle), in chocolate soil, attaining a height of 60 to 100 feet, with a diameter of 1 to 2 feet. Bark collected in April, 1889, yielded the following April, 25·9 per cent. of tannic acid and 45·7 per cent. of extract. This has the general appearance of *A. decurrens* bark, but is in layers, separable with a little difficulty, more fibrous, and has the appearance of having been dusted on the outside with a white powder. The whitish appearance does not rub off, and the stem looks as if it had had a coat of lime-wash. It is the work of a lichen.

A perfectly smooth, thin, silvery or ash-grey bark, from near Penrith, N.S.W., gave 24·13 per cent. of tannic acid and 47·85 per cent. of extract.

Barks received from Mr. C. Brownrigg, gathered in June, and obtained from parish of Beaufort, Cowra district, diameter of tree 10 inches, yielded 16·5 per cent. of tannic acid and 42·4 per cent. of extract. A second sample from the parish of Calout, in the same district, from a tree 7 inches in diameter, gave 20·3 per cent. of tannic acid, with 43 per cent. of extract. Mr. Brownrigg kindly furnished the following notes with these samples :—*Beaufort sample*—"Extensive forests of good, sound, old, and young trees, not affected by

the ringbarking of other timber." *Calout sample*—"Since the ringbarking of the box and other timber, nearly all the old wattle trees have died away; a young forest appears to be growing up."

Bark from county Auckland (Monaro), and stripped in November, gave 24 per cent. of tannic acid and 42·55 per cent. of extract.

Two samples from the Cooma district gave 24 per cent. of tannic acid, with 49·6 per cent. of extract, and 25·5 per cent. of tannic acid, with 51·2 per cent. of extract, respectively. The latter bark is worthy of special mention. It is quite black, having not a trace of the whitish appearance generally found on the bark of this species. It was brought to me as Green Wattle (*Acacia decurrens*, var. *mollis*), and there seemed no necessity to doubt the diagnosis. No expert could have told the difference between it and Green Wattle if he had not been permitted to test it. It is a good instance of the deceptiveness of appearances.

"Silver Wattle" bark may be assumed to contain about 25 per cent. of tannic acid in the best samples.

In Tasmania the destruction of these trees has often been recommended in order to let var. *mollis* grow, and this advice is probably sound, but only in cases in which one or other has to be sacrificed.

I think I have adduced sufficient evidence to convince intelligent people that the bark is by no means a worthless one, and barks inferior even to this are locally used in districts not favoured with the alternative of the use of such a bark as other varieties of *decurrens*. I hope that barks in a particular district will be tried on their merits, and not be condemned without trial.

In insisting on the general principle of assay of barks, just as a man engaged in the mining industry is always careful to sample his stone as occasions require, I am quite aware of the special circumstances of Tasmania as regards the "Silver Wattle," and that the case in that State against this particular variety is stronger than it is in our own. In Tasmania the "Silver Wattle" grows more in spars than with us; its bark has a more than ordinary tendency to shrink; it is tough and fibrous (though not to such an extent as *A. binervata*, for instance). As wattles take longer to mature in Tasmania than with us, it will be quite understood that I am in no way reflecting on the wisdom of the advice of letting the cultivation of the best species remain unimpeded.

A New Zealand (Auckland) correspondent states that his four-year old var. *dealbata* trees are 35 feet high in a sheltered place, with a diameter of 4 to 8 inches at 3 feet from the ground. They grow quicker than var. *mollis* in his particular district. Var. *dealbata* is not indigenous in New Zealand (nor is, in fact any *Acacia*), and it is a pity that this species has been introduced into that Colony for its yield of tan-bark, as I understand has been done in several instances, whether deliberately, or by a mistake in seed, I am unable to say.

The "Silver Wattle" sometimes obtains an enormous size in Tasmania, Victoria, and southern New South Wales. In Tasmania, Backhouse measured a tree 11 feet 2 inches in girth, and "Silver Wattles" approaching 100 feet in height have frequently been found in all three States.

f. var. *lanigera*, var. nov.—A small tree or tall shrub characterised by every part of it—old and young leaflets, rhachises and twigs, and pods—being densely covered with a white or brown indument.

It may be described as an "exaggerated" form of var. *dealbata*, but so much more woolly-hairy than var. *dealbata* as to be worthy of some designation.

Leaflets about twenty and over, coarser than those of var. *dealbata*, the variety it most closely resembles. Harvey Range, J.L.B., 1905 (type). Closely allied forms from Gloucester Buckets, E.B., 1882; J.H.M., 1897; Parkes Water Supply, J.H.M., 1897.

In the plate of "Foliage of varieties of *Acacia decurrens*," facing p. 34, the figures are more or less diagrammatic. Var. *normalis* is more "fern-like" than the others. In var. *Leichhardtii* the longish brown hairs on the rhachis are omitted for the sake of clearness.

A. decurrens yields an important tan-bark in most of the States, and every encouragement should be given to its cultivation. This wattle and the South Australian *A. pycnantha* will supplement each other, the former flourishing in situations too damp and cold for the latter. Varieties of *A. decurrens* are at present abundant on some Crown and other lands in various districts of the State where thousands, and perhaps millions, of seedlings may be sometimes seen, forming a dense useless brush, liable to destruction by bush fires. In these localities we do not require to sow seed, but to use the tomahawk. They should be thinned out freely, to admit light and air to the most promising seedlings, which will then have some chance of forming trees capable of carrying a merchantable amount of bark

In many places selectors wage war against this tree, simply looking upon it as a troublesome weed. They should try the thinning process, leaving the most shapely trees. They will find that wattle scrub (of the right kinds) will become of value, instead of a nuisance.

Mr. J. E. Brown states that in South Australia this species is much less hardy than *A. pycnantha*, but in other States this is not the general experience. Baron von Mueller recommends planting of *A. decurrens* in worn-out lands overrun with sorrel. It is fond of moisture, and not of too much heat. The Baron also gives its rate of growth as about 1 inch in diameter every year. Mr. J. E. Brown mentions some trees in South Australia 30 feet high and 8 inches in diameter, only 5 years of age, and I can record similar experience near Sydney. It is rather liable to attacks by borers.

It is a useful tree for making a quick-growing shelter for vineyards, orchards, &c.

Cultural Notes.

The following notes are, as a rule, directly based upon observation with the *mollis* variety of *Acacia decurrens*, but are more or less applicable to all varieties of *decurrens*.

Mr. Evan Francis writes:—"In a garden in Bega, a few years ago, I sowed seeds of black wattle on 1st September, and on the 1st January, following, plants were measured 11 and 12 feet high; this, for four months, was enormous growth."

Following is an account by a New Zealand correspondent (Waikato, Auckland), of his experience in regard to this variety, which may be useful for the guidance of others in similar localities:—

"I have about 5 or 6 acres of *mollissima*. I got the seed from Tasmania. They are growing the best of any I have got. They do not make much tap root; they spread the roots near the surface. They were sown two years

ago last month (September), and some of them are 12 feet high, without any shelter. They are the best to remove. I planted an acre with young trees taken out of them twelve months since last March. I took them without any soil, and there is not one dozen in the whole lot that have died; but I find that after you plant any of the *Acacia* tribe, they do not commence to grow till twelve months after they are planted. I have no doubt that they will grow much better under the bamboo system."

In another letter my correspondent says :—" Trees four years old are 25 to 28 feet high, and 5 inches in diameter at 3 feet from the ground. They had no shelter."

The following interesting observations of Mr. William Bæuerlen are instructive, as showing the advantages of cultivating natural seedlings of wattle, instead of allowing them to take their chance—in other words, they are responsive to any attention. At the same time, this method is most successful in rainy rather cold districts :—

Major's Creek, near Araluen, New South Wales, planted Green Wattles from seedlings in August, from 12 to 15 inches high.

		Height.	Girth.
6 years old ..	1 ..	25 ft. ..	30 in., 3 ft. above ground.
Do ..	2 ..	28 „ ..	24 „
Do	3 ..	21 „ ..	21 „
4 years old ..	1 ..	20 „ ..	24 „
Do ..	2 ..	18 „ ..	20 „
2 years old ..	1 ..	15 „ ..	11 „

None of the wattles from the place from which these were taken for planting (and some even exceed six years in age) exceed 15 feet in height, and 10 inches in girth.

In the same locality, there is a tree ten years old, which is 30 feet in height, and has a girth of 3 feet 7 inches. The tree is remarkably straight and healthy, the bark on the trunk having quite a smooth, young appearance yet. A tree of the same dimensions out in the bush would have a dark, rough, furrowed bark, and would doubtless be twice the age.

Mr. Evan Francis, when at Bega, also experimented with bush seedlings, and this is what he says :—

" In six months the trees ranged from 10 to 15 feet in height. The taller trees were in the more sheltered positions. Single specimens in open ground did not succeed half as well as those in the centre of the grove, where they were mutually sheltered. A distance of 9 feet, plant from plant, seemed the correct thing.

" At two years the trees were fine saplings of about, on an average, 20 to 25 feet high. We estimated that a yield of from 30 to 40 lb. of dry bark would be given by these trees at four years old, but they reached their prime at six years, when the bark at the lower parts of the trees had great substance, and the yield of dry bark would be fully 60 lb.; and I am sure selected trees would have reached 100 lb."

Acacia pycnantha, Benth. Dietr., *Fl. Univ.* n. Ser., t. 86. Brown, *For. Fl.* t. 11. Engler, *Nat. Pflanzenfam.* iii, 3, p. 109, fig. 64.

The "BROAD-LEAVED WATTLE" of South Australia; called also "Golden, Black, or Green Wattle." It was known under the name of "Witch" by the aborigines of Lake Hindmarsh Station, Victoria.

One of the richest tanning barks in the world; a richer may exist, but I do not know of it. A sample of this bark was received by me in 1883 from Messrs. F. Pflaum & Co., of Blumberg, South Australia, with the note, "contains 33·5 per cent. of tannin, according to Mr. Thomas, of Adelaide." I analysed the sample in April, 1890, and obtained the following extraordinary result by Löwenthal's improved process—the process I always adopt, viz.:—

Tannic acid	46·47 per cent.*
Extract	74·7 ,,

This has been stored seven years in the Museum, and has doubtless increased in percentage of tannic acid during that period. Nevertheless it is the grandest specimen of wattle-bark I have ever examined. It is smooth, a model of compactness, contains a minimum of fibre, and therefore powders splendidly, is of good colour, and an excellent bark in every way. South Australia has practically the monopoly of this bark, and it is a grand heritage,—the envy of the Eastern States.

A second sample forwarded to me April, 1890, and analysed the same month, is from the vicinity of Mount Torrens, 20 miles east of Adelaide, and was obtained from Mr. J. E. Brown, then Conservator of South Australian Forests, through the courtesy of Mr. Albert Molineux, Secretary of the Agricultural Bureau of that State. It yielded 39·1 per cent. of tannic acid, with 73·5 per cent of extract. It is, of course, an admirable bark, but it is thinner than the preceding sample, and would at once strike an expert as second to it. But even this contains nearly 3 per cent. of tannic acid more

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* The record of the highest percentage of tannic acid found in any Australian bark seems to me to be of very considerable interest. It is to be regretted that analyses of tanning materials are not always strictly comparable unless conducted under precisely similar conditions.

"Mr. J. M. Reid, President of the South Australian Chamber of Manufactures, while in Sydney a few days ago submitted samples of wattle-bark from that State to Mr. Helms, of the New South Wales Department of Agriculture, for analysis.

"The first result worked out as follows —Moisture, 11·20 per cent.; tannin, 49·76 per cent., expressed in terms of crystallised oxalic acid by Procter's method, 56·03 per cent. in the dry bark.

"This being an exceptionally high result, he took further and different methods of testing the sample, but on each occasion similar figures were obtained. Mr. Helms expressed his great surprise at the standard attained, and spoke most highly of the South Australian product. Those interested in the wattle industry in that State have heard many disquieting reports about the West Australian mallet bark, and of its high tanning properties. An analysis of such bark made at the South Australian School of Mines, on a sample submitted, gave the following result:—Tannin, 25·7 per cent., expressed in terms of crystallised oxalic acid, so that there is very little to fear in competition with this article. Above all things (says the *Adelaide Advertiser*) local growers must carefully harvest their bark, and see that the trees which are being stripped are properly matured. The test of Mr. Helms beats the one made some years ago by Mr. J. H. Maiden (then Curator of the Technological Museum, Sydney), who has made Australian wattle a particular study, and who got as a result 46·47 per cent. of tannic acid from a sample submitted from South Australia."—(*Daily Telegraph*, Sydney, 22nd August, 1905.)

ACACIA PYCNANTHA.
SOUTH AUSTRALIAN GOLDEN OR BROAD-LEAVED WATTLE.

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than any other sample of wattle-bark of other species I have examined. It is, however, only fair to say that I was unable at the moment to procure samples of the best brands of Tasmanian *decurrens* bark.

In forwarding the sample, Mr. Molineux says: "The bark was taken from a height of about 2 feet above ground. It was from a large tree, of which there have been, and still are, great numbers in the locality. Mount Torrens district is the best in the State for rich good bark."

The following are results of analyses of thirteen samples of *A. pycnantha* bark received from Mr. J. E. Brown. They were stripped 29th April, 1890, analysed a month later, and were grown on the Government Farm, Belair, South Australia. Height of trees, from 8 to 14 feet.

No.	Age, Diameter, and part of Tree from which taken.	Percentage of Tannic Acid.	Percentage of Extract.	Geological Formation, Soil, &c.
1	From butt of tree; diameter, 3½ in. (Age, about 5 years.)	37·5	63·9	Nos. 1 to 7 are taken from trees growing in an uneven basin, between the lower and upper ranges; soil, light sandy loam over gravel wash and yellow clay.
2	From limb of No. 1.....	33·75	63·25	
3	From butt of tree; diameter, 2 in. (Age, 4 years.)	28·5	57·75	
4	From butt of tree; diameter, 1¾ in. (Age, 3 years.)	36·25	68·35	
5	From butt of tree; diameter, 2 in. (Age, 4 years.)	36·5	64·25	
6	From butt of tree; diameter, 2½ in. (Age, 4 years.)	37·5	65·35	
7	From limb of No. 6.....	32·95	63·25	
8	From butt of tree; diameter, 4½ in. (Age, 5 years.)	37·25	64·5	No. 8, from the S.W. slope of the upper ranges; soil, light clay over bed-rock of hard sandstone.
9	From limb of No. 8.....	38·5	66·2	
10	From butt of tree; diameter, 2 in. (Age, 4 years.)	35·95	63·4	No. 10, from the top of upper range; soil, about 2 in. of light sandy loam over bed-rock of hard sandstone.
11	From limb of No. 10	32·1	63·1	
12	From butt of tree; diameter, 3 in. (Age, 5 years.)	35·5	64·85	No. 12, from N.E. slope of upper range; soil, same as No. 10.
13	From butt of tree; diameter, 4 in. (Age, 7 years.)	35·45	63·5	No. 13, same as No. 8.

It will be noticed that in three cases, Nos. 2, 7, and 11, the results of analysis are slightly lower than that of the bark gathered from the butt of the same tree, but in the case of No. 9 the result is slightly higher; the appearance of the bark, when powdered, of No. 8, was too dark to be first class, while that of No. 9 was the best of the whole thirteen samples, and gives the best result.

The powder from the bark of the limb is generally of a lighter colour than that taken from the butt, although the powders of Nos. 5, 10, and 12 were very light for bark taken from the trunk of the tree.

The bark of No. 3 was not first class, being far too fibrous.

In Part III of the *Forest Flora of South Australia*, by J. E. Brown, the following analysis of this bark by Mr. G. A. Goyder, Superintendent of the Crown Lands Laboratory at Adelaide. The localities are all South Australian.

Locality where grown, elevation, &c.	Character of soil upon which grown.	Age of tree.	Weight of bark from each tree.	Thickness of bark.	Portion of tree which taken.	Percentage of Tannin.	Total extractive matter.
		Yrs.	lb.	in.			
Government Farm—							
Belair, elevation 1,000 ft.	Sandy loam, with clay subsoil.	6	45	0·22	trunk	34·0	55·3
					wood and bark of twigs.	5·1	20·5
Do	do ...	6	...	...			
Torrens Island—							
Almost sea-level ...	Deep sandy soil..	5	38	0·23	Trunk	25·2	46·5
Do	do ...	5	...	0·04	Twigs	21·7	40·8
Bundaleer Forest—							
Elevation 1,800 ft...	Ferruginous loam, with clay subsoil.	7	128	0·20	Trunk	31·4	49·9
Do	do ...	7	...	0·05	Twigs	22·3	45·6
Semaphore—		Abt.					
20 ft. above sea-level	Deep sand	30	307	0·18 (*sic*)	Trunk	25·8	42·6
Brighton—							
20 ft. to 30 ft. above sea-level.	Clay soil	6	...	0·21	Trunk	28·7	53·4
Do	do	6	...	0·03	Twigs	25·3	41·6
Mount Gambier	Calcareous sand.	7	...	0·13	Trunk	31·7	52·0

I am of opinion that these analyses under-rate the value of *Acacia pycnantha* bark.

Mr. J. E. Brown, when in South Australia, cultivated this species very largely in districts found suitable for it, and his general remarks on wattle cultivation (*ante*) were chiefly written with this species in view.

"Except in very dry localities, this species is common to nearly all districts of South Australia north of Encounter Bay, and is occasionally to be met with along the coast from Kingston to the Glenelg River. Its principal habitat, however, and the one where the thoroughly typical botanical form and the largest trees of the species are found, is in the Adelaide hills and plains, from Encounter Bay to Clare. For propagation purposes seed should, if possible, be obtained from trees grown within these limits. In some parts of the north of the Colony there is a narrow-leaved variety, with the stem and branches covered with a whitish substance, which is desirable should not be propagated, as the tree is of slow growth, and does not attain payable dimensions." (J. E. Brown. Reports.)

Average height of typical form 20 to 25 feet, and diameter 6 to 10 inches. (Brown.)

Mr. Brown gives the life of this tree at from ten to twelve years, and states that it may be stripped from the sixth to the ninth year, according to circumstances. It lives longer in sandy soils than in clay ones.

The following six barks of this species were forwarded to the Museum by Mr. A. L. Thrupp, Balhannah, South Australia. They form a very interesting

series, consisting as they do of samples of the best bark obtainable, together with very inferior and ordinary specimens, grown under varied influences of soil and climate :—

No. 1 is a splendid sample of the bark of this wattle; it is thick, fairly smooth, and was taken from a tree of large diameter; it was grown at Mount Torrens, South Australia; analysed August, 1890, and found to contain 42·1 per cent. tannic acid and 67·75 per cent. extract.

No. 2. This is also a good specimen of bark; it was grown at Oakbank, South Australia; analysed August, 1890, and found to contain 41·75 per cent. tannic acid and 71·38 per cent. extract.

No. 3. Grown at Millicent, South Australia, in sandy soil; it was taken from a tree of fair size; analysed August, 1890, and found to contain 35·5 per cent. tannic acid and 68·9 per cent. extract.

No. 4. This is an inferior-looking bark, scaly and fibrous; it was taken from trees growing in scrub country near Blumberg, South Australia; analysed August, 1890, and found to contain 30 per cent. tannic acid and 59·6 per cent. extract, which result must be considered good from such an unpromising looking bark.

No. 5. Grown at Melrose, South Australia. The bark is from young trees, and not at all promising in appearance. It was analysed August, 1890, and found to contain 21·2 per cent. tannic acid and 42·3 per cent. extract.

No. 6. This is a thin, fibrous, scaly, and very inferior-looking bark, taken from trees growing at Carruson, South Australia, where, owing to insufficient rainfall, they are stunted in growth; analysed August, 1890, and found to contain 15·1 per cent. tannic acid and 32·75 per cent. extract.

Mr. G. S. Perrin summarises the advantages of this species over *A. decurrens* by stating that the former species is more amenable to culture, and can be pruned to a better shape, occupies less space in the plantation, and is much better stripped.

Baron von Mueller (*Select Extra-tropical Plants*) says :—"It is of rapid growth, content with almost any soil, but is generally found in poor sandy ground near the sea-coast, and thus also important for binding rolling-sand."

In an earlier portion of this work I have gone into the question of soil, &c. Generally speaking, it loves a warm climate, with only a moderate rainfall. It, therefore, will not usually flourish at elevations over 2,000 feet.

I have already dealt with the matter of localities. It is essentially a South Australian species, though it extends into both Victoria and New South Wales.

So-called delicate plants, such as this species, may be successfully grown in rather cold districts, *e.g.*, Blue Mountain, Moss Vale, &c., in New South Wales, by taking advantage of a fact well known to gardeners, viz., they should be planted with a westerly aspect, so that the sun will not shine on them too early after a severe frost.

A New Zealand correspondent writes :—"*Pycnantha* trees, 4 years old, are 6 feet high, and 2 inches in diameter at 3 feet from the ground, in the Auckland district of New Zealand. Land rather strong, with sand in it, and on a clay subsoil."

In another instance in this district, the scrub was cut, the land ploughed in strips, 10 feet apart, and the seed drilled in at the rate of 1 lb. to the acre. Since then the trees have been allowed to grow wild, never having been

thinned or the land cleared, or, in fact, having one penny spent on them. In six years the best trees are over 10 feet high, and 3½ inches in diameter, and the *decurrens* trees are over 20 feet high, and 5 inches in diameter.

It is confined to South Australia, Victoria, and New South Wales. In our own State it is confined to country, so far as is known, adjacent to Victoria and South Australia. It is only, as regards New South Wales, represented in National Herbarium, Sydney, from Tocumwal.

This wattle has been acclimatised in many districts of New South Wales, so much so, that it is often looked upon as indigenous in localities in which it has been planted. It is a very handsome species, with its large deep-yellow flowers, abundantly produced, and full of perfume. The stout pedicels and petioles appear to be characteristic of the species.

Acacia penninervis, Sieb.

Usually called "HICKORY," or "Mountain Hickory." Occasionally called "Black Wattle," *e.g.*, Blue Mountains.

The greater amount of wattle-bark used by Australian tanners, or exported from our shores, is the produce of two species of Acacia—namely, *Acacia decurrens* (and its varieties) and *Acacia pycnantha*. There is another wattle of surpassing excellence, one worthy to be mentioned in comparison with these two. Some years ago I examined a wattle-bark from the extreme south of this State, quite different in appearance from the smooth barks which are usually associated in Australia with high percentage of tannin. To my surprise, I found it to contain 34 per cent. of tannic acid. I repeated the experiments with fresh samples, but the results never varied 1 per cent. altogether. In other words, this bark contains one-third of its weight of tannic acid, calculated on the dry bark. Many communications have reached me, particularly from Queensland, in regard to this matter, and the subject is of great commercial importance to our State. Unfortunately there are several so-called hickories in this State, and, therefore, care is necessary to indicate the right one. That hickory which looks like a pepper tree and which is found on the banks of water-courses and in gullies in the Blue Mountains, and also at Picton, Bargo, Mittagong, and other places in the Southern districts, is *Acacia elata*. Most of our hickories (and *Acacia penninervis* is no exception), however, are *phyllodinous* (see p. 56). Amongst these, which are known as hickory in different places, are *Acacia binervata* (one of the black wattles), and even the blackwood (*Acacia melanoxylon*), and the closely allied *Acacia implexa*.

It is worthy of note that in some districts in which mountain hickory occurs the bark has never been stripped and tried, for the reason that people do not look upon it as a wattle, imagining it to be a gum-tree! This state of things is passing away, as the bark is now becoming appreciated in certain quarters, to my personal knowledge, and it is only another instance of the unknown wealth waiting to be known, and therefore utilised.

My readers will observe from the drawing how variable in size and contour are the leaves (*phyllodia*) of the mountain hickory. It is, in fact, a very variable species, but it may be usually known by means of the thickened dot or gland which is found a little distance along the rim (or marginal vein) of the leaf, and from which another vein extends, in a curved manner, to the leaf-stalk. A small leaf-shaped enclosure, varying in size, is thus partitioned off out of the area of the leaf itself.

ACACIA PENNINERVIS.
MOUNTAIN HICKORY.

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A specimen, too, from near Moruya, has very narrow leaves (variety *angustifolia*, below), varying in breadth from a quarter to half an inch, and from 8 inches to 12 inches in length. Another, from Mount Dromedary, has its leaves 8 inches long and 2¼ inches broad. The average size, however, may be given as 5 inches long, and 1 inch broad. This will explain why different trees are known as narrow-leaved and broad-leaved mountain hickory respectively.

I proceed to give a number of analyses of representative samples of this bark from different places in New South Wales. I have already alluded to one bark which gave 34 per cent. of tannic acid; it also yielded 55·2 per cent. of extract, and came from Brown's Camp, near Delegate. I have not come across a finer sample of this bark, though there is much of equal quality. The mature trees which yielded this excellent result must have each contained half a ton of bark.

Bark from Mount Dromedary, stripped in December, gave 32·25 per cent. of tannic acid and 53·15 of extract. A sample grown at Mount Victoria (Blue Mountains), stripped in June, gave 29·03 per cent. of tannic acid and 57·25 per cent. of extract. Height of the tree, 40 feet; diameter of stem, 6 inches. Bark from Rylstone (Mudgee Line), stripped in December from young (immature) trees, yielded 25·25 per cent. of tannic acid and 42·45 per cent. of extract. All the above are from the "broad-leaved" or typical kind.

The following are "narrow-leaved" (variety *angustifolia*). Bark from Nelligen, stripped in December, gave 32·25 per cent. of tannic acid, and 52·8 per cent. of extract; while a specimen from the Dromedary, much further south, gave an almost identical result, viz., 32 per cent. of tannic acid and 52·7 per cent. of extract.

The following analysis was given by the Queensland Commissioners, Colonial and Indian Exhibition, 1886:—Tannic acid, 14·49 per cent.; extract, 33·06 per cent. I have received a Queensland sample from Dr. T. L. Bancroft, of Brisbane, who obtained it from Enoggera. It was from trees 15 feet in height and 6 inches in diameter, was collected in May and analysed in July. It gave 18·24 per cent. of tannic acid and 35·95 of extract; but the bark is too thin, and it gives too dark-coloured a liquor for it to be looked upon very favourably.

A. penninervis, Sieb., was described from Sieber's *Pl. Exs.* No. 458. I have not seen the type,* but assume that it is the common "Tanning or Black Wattle" or "Mountain Hickory," already referred to. *A. astringens*, A. Cunn., is probably a synonym, as also *A. falciformis*, DC. (Sieber's *Pl. Exs.* No. 616).

In addition to this, we have two well-marked varieties:—

a. var. *angustifolia*, var. nov.—A long narrow phyllode form, found only on the South Coast, so far as I know. Phyllodes commonly 6 inches long and under half an inch wide, straight or slightly falcate. The pods are narrower than in the normal form. The young shoots and the rhachises of the inflorescence are sometimes densely covered with golden yellow hairs.

The long narrow phyllode shown in the figure is of this form.

b. var. *lanceolata*, R. T. Baker.*—This is a form often with hardly falcate phyllodes and commonly with small, short, often narrow phyllodes, pale or yellowish green. The pods often markedly reticulate. It is usually a dry country plant and a shrub or small tree. It is widely diffused, but is comparatively unimportant as a source of tan-bark.

* I have since seen the type. See p. 97.

Acacia penninervis is confined to Tasmania, Victoria, New South Wales, and Queensland.

As regards the occurrence of the mountain hickory in Victoria, Baron von Mueller speaks of it as scattered through the eastern half of the State, over ridges and ranges, gregarious on some of the sub-alpine declivities and plateaux.

New South Wales seems to be the natural home of the tree. In our State it extends from south to north, in the eastern half, on the southern ranges, the Dividing Range and its spurs, and the New England district.

While this species is so abundant, and so extensively distributed, it would appear that only bark from the colder parts of New South Wales is of any great commercial value, and I therefore give particulars of such localities in a little more detail.

It is found from the Clyde and Bateman's Bay district, all along the coast land, right down south to the boundary of Victoria. On the eastern mountain slope and ranges it attains a good height (20 feet to 40 feet), with a diameter up to 18 inches. Trees a foot in diameter are common. It is found a good size along the strip of forest land fringing the plains of the Monaro. The largest trees appear to occur in the mountain ranges near Delegate, which form the southern boundary of the Monaro, where for instance, near Brown's Camp (the locality from which I first obtained the samples which enabled me to draw attention to the extraordinary value of this bark), the trees attain a height of from 40 feet to 80 feet, and a diameter up to 2½ feet, while trees of a diameter of 18 inches to 24 inches are not scarce in the locality.

Nelligen, Moruya, Araluen, Tilba, Cobargo, Colombo, Bega, Candelo, Bombala, Delegate, and the Twofold Bay district are good localities.

It is less common in New England, but employed in the Mudgee, Tamworth, and other districts for tanning.

The following notes from a southern correspondent who forwarded me some barks, include some additional localities :—

"No. 1. Local name Hickory or Black-wattle, taken from a tree 40 feet in height, 16 inches in diameter, growing plentifully on ridges and high lands in the parishes Wagonga, Noorooma, Tilba, Bodalla, and neighbourhood, county of Dampier, for miles round the base of Mount Dromedary; soil generally light on slate formation.

"No. 2. Local name Broad-leaved Hickory, though not so plentiful as No. 1, yet in abundance, more particularly about Milton, Bermagui, Tilba Tilba, Reedy Creek, Cobargo, and along Tuross River. It is not uncommon to see trees 2 feet in diameter; that from which No. 2 specimen was taken measured 20 feet in height and 12 inches in diameter."

If possible, no tree under a foot in diameter should be stripped; immature trees give little bark, which contains comparatively little tannic acid. To strip mountain hickory saplings is simply killing the goose with the golden eggs. It is not surprising that so large a tree yields rather a thick bark. A certain specimen is over five-eighths of an inch thick, is rugged, something like an ironbark, only more stringy.

Some of the localities represented in National Herb., Sydney, are as follows :—

Mount St. Bernard (C.W.) and Mount Hotham (J.H.M.), both in the Victorian Alps.

New South Wales—Southern localities.—Thredbo River and Mount Kosciusko up to 5,500 feet (J.H.M.); Mount Imlay, Twofold Bay (J.M.C.), and Eden to Pambula (J.H.M.), (localities for var. *falciformis*, Benth.); Nimitybelle to Tantawanglo Mount, J.H.M.; Barber's Creek, H.J.R.; Hill Top, J.H.M.; Menangle, R. Harper.

Western localities.—Mount Victoria, E.B.; abundant, Mount Victoria to Jenolan Caves, J.H.M.; Bowenfels Churchyard, a tree 2 feet in diameter, J.H.M. and R.H.C.; Jenolan Caves, W.F.B.; Sunny Corner, J.L.B.; Rylstone district and Bylong Creek, R.T.B.; sometimes called "Tanning Gum" in Bathurst district, J.H.M. The phyllodes are looked upon as "gum leaves."

Northern localities.—Near Copeland, A.R.

"Hickory it is always called in New England.

"I have stripped trees over 2 feet in diameter, and 50 feet of bark, and weighing over 8 cwt.

"It also grows on the main Liverpool Range.

"The trees from which we get the bark grow mostly on spurs off the main range both east and west. I have seen the same kind of bark used in Bathurst, and which I was told was got from towards Mudgee. We have been using the bark 23 years, and like it for dressing leather better than any other.

"As I told you, the tree blossoms early in November."—W.J.S. (the Tannery, Tamworth).

"The broad-leaved hickory grows all over this (Glen Innes) and Tenterfield districts, but very scattered with few exceptions, those being principally on Pastoral Holdings Rivertree, Koreelah, Oakwood, Mowen and Sandy Hills. Although it is stripped when in full blossom, it retains enough sap in the limbs for the seeds to properly ripen."—(Forester Powell.) Mount Mitchell, 5,000 feet, (Dr. H. B.); a New England locality marked var. *falciformis*, by Bentham. Guy Fawkes and Round Mountain. Forming dense belts of a scrubby growth up to 8 or 10 feet high in various localities about Guy Fawkes, and up to within a very few feet of the very top of the Round Mountain. Young shoots and inflorescence minutely hoary or golden-pubescent, phyllodia falcate, but rather small at the highest elevations (J.H.M.).

Tenterfield to Sandy Flat, E.B., J.H.M.

Var. *angustifolia*, Maiden.—"Black-wattle, up to 30 feet," Milton, R.H.C.; Conjola, W.H.; Bateman's Bay, J.H.M.; Mogo, near Moruya, W.B.

Var. *lanceolata*, R. T. Baker.*—"Shrubs of 3 and 4 feet. Foot of Big Jack Mountain, Bombala district," J.H.M.; "Black-wattle," Weddin, Grenfell, and county of Ashburnham generally, W.S.C., J.G.P., and J.H.M.

Rylstone district, J. Dawson and R.T.B.; Cow Flat, 11 miles south of Bathurst, R.H.C. No. 755; Parkes Water Supply, J.H.M.; Bushrangers' Rocks, Eugowra, R.H.C.; Wellington, W.B. and J.H.M.; Minore, Dubbo, J.L.B; Harvey Range, J.H.M.; J.L.B.

Tamworth, W.J.S.; Tingha, R.H.C.; Moona Plains, Walcha, A.R.C.; Howell, R. Hart, J.L.B.; Warialda, H.M.R.R., and Emmaville, J.L.B. Phyllodes very attenuate at the base in these two localities.

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* See page 97.

Acacia binervata, DC., *Bot. Mag.*, t. 3338, as *A. umbrosa*. Maiden and Campb. *Fl. Pl. and Ferns*, No. 19.

Illawarra "BLACK WATTLE" or "TWO-VEINED HICKORY."* "Myimbarr" of the aborigines of Illawarra (New South Wales).

This is a valuable bark; specimens from Cambewarra, N.S.W., yielded me up to 58·03 per cent. of extract, and 30·4 per cent. of tannic acid. The colour of this sample was dark-brown; the inner bark warm red-brown; the outer bark deeply-fissured or flaky, which makes it more or less pulverulent; the inner bark contains abundance of strong fibre; diameter, 12 inches,; height, 20 to 25 feet; locally called "Black Wattle." (*Proc. R.S., N.S.W.*, 1887, p. 90.)

A second sample from the same locality gave 28·2 per cent. of tannic acid, and yielded 51·5 per cent. of extract.

I have examined a specimen from Tomerong, near Jervis Bay, N.S.W. (between Nowra and Milton), which was collected February, 1888, and analysed the following September. (*Proc. R.S., N.S.W.*, 1888, p. 273.) As received, it had had its first crushing in the mill; nevertheless it was possible to pick samples showing a fair proportion of inner and outer bark. The outer bark is somewhat scaly, and the inner bark is light reddish-brown and very fibrous. It cannot be mistaken for *A. decurrens* bark owing to its fibrous nature. It gave tannic acid, 19·3 per cent.; extract, 37·8 per cent.

This sample was taken from bulk actually used by a tanner, and it will be found, in general, that barks containing 20 per cent. of tannic acid are commonly used by country tanners; in fact, if bark of a species gives as high as 15 per cent. of tannic acid, it is worthy of inquiry whether richer specimens are available.

The above are southern localities; following are from northern :—

Bark from Booral, county of Gloucester, stripped in July, and analysed in August, gave 28 per cent. of tannic acid, and 51·55 per cent. of extract. It was from a tree 30 feet high, and 8 inches in diameter.

A further sample from Stroud (in the same neighbourhood) collected in January, gave 27·75 per cent. of tannic acid, and 48·9 per cent. of extract.

This is a coast species of New South Wales and Queensland. It is frequently a large tree, and yields much bark.

Moruya, most southern recorded locality, W.B.; Conjola, W.H.; Berry's Crossing to Nowra, W.F. and A.A.H.; Berry Mountain, very large trees, J.H.M. and R.H.C.; Mount Kembla, A.G.H.; Appin, J.H.M. and R.H.C.; National Park, E.B.; Awaba, J.L.B.; Stroud, A.R.; Crawford River, E.C.; "Black Wattle," Taree, District Forester Hardiman; Upper Hastings, J.H.M.; Drake, E.C.A., J.L.B.

Acacia elata, A. Cunn., Ic. Aust. Ac.

"Cedar" or "White Cedar Wattle" of the Picton district; "Cedar Creeks" are named after it. I am informed that this species is known as "Black Wattle" in the Kurrajong district. "Meroan-gauge" of the Illawarra blacks, according to the late Sir William Macarthur.

It looks a good deal like the frequently cultivated pepper-tree (*Schinus molle*), as regards its foliage and habit. It is one of the most beautiful of

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This wattle may be easily recognised by the two prominent veins on the leaf.

ACACIA BINERVATA.

ILLAWARRA BLACK WATTLE.

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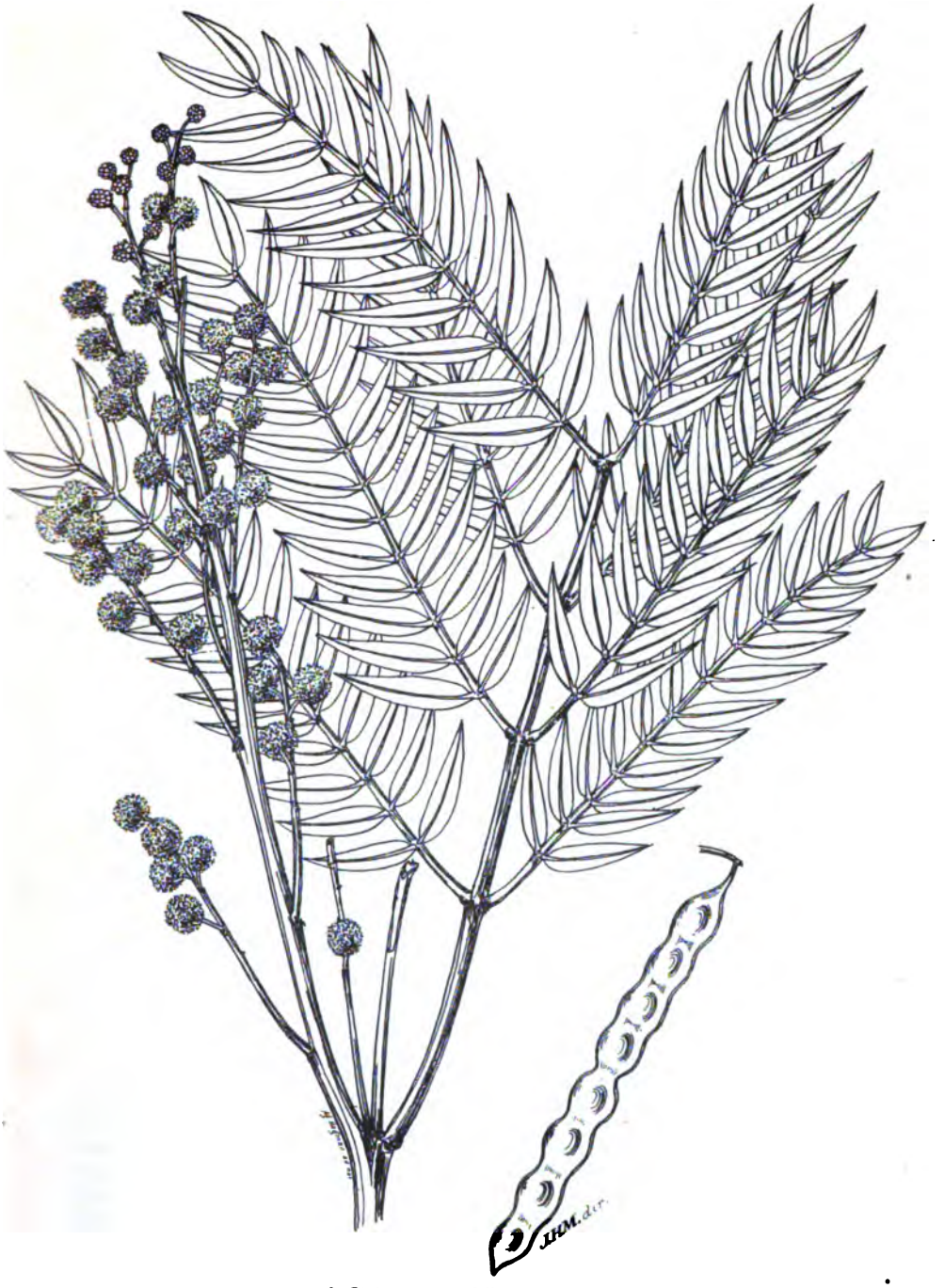

ACACIA ELATA.

A HICKORY.

UNIV. OF MICH.

the arboreous Acacias, and it frequently attains a large size—*e.g.*, a correspondent of mine obtained fifteen 4-bushel sacks of bark from one tree. I measured a tree at Milson Island, Hawkesbury River, 3 feet in diameter, at 3 feet from the ground, and 1 ft. 10 in. at 10 feet from the ground.

A specimen of bark of this tree was analysed (*Proc. R.S., N.S.W.*, 1888, p. 271), and yielded 20·11 per cent. of tannic acid, and 36·2 per cent. of extract. Height, 50 feet; diameter, 8 inches. Flaky and somewhat rugged on the outside, but often blackish, and stained with lichens, on account of its habitat (gullies). This sample reminds one of that of *A. decurrens* when young. This is a tree of local distribution, and were it more abundant it would come into notice as a tanner's bark, since the sample examined (obtained from Springwood, Blue Mountains), was hardly up to the average quality obtainable.

Two samples of this bark were received at the Technological Museum, May, 1890, from Kanimbla Valley, Blue Mountains—one from a large tree 30 to 50 feet high, diameter 15 inches, the other from a small tree.

The bark of the larger tree contained much scaly material on the outside of a dark-brown colour, which, being deficient in tannic acid, detracts from the value of the bark. The thickness of this bark is 1 inch, half of which represents the inner bark, which is fibrous, very astringent, and of a light colour. Analysis of this bark (a fair section of outer and inner being taken), was made in June, 1890, and it was found to contain 28·5 per cent. of tannic acid, and 51·15 per cent. of extract. The liquor is of too dark a colour to be first-class, but would be improved by removing the outer scaly bark before grinding, if that were possible.

The bark from the younger tree was solid, slightly scaly on the outside, and ¼ inch in thickness. When powdered, it was hardly to be distinguished from some specimens of *decurrens* bark, being light coloured, and altogether a promising bark. Analysis shows this to contain 31·1 per cent. of tannic acid, and 55·35 per cent. of extract.

A specimen from Robertson, stripped in January, yielded 28 per cent. of tannic acid, and 49·75 per cent. of extract. This also gave a light-coloured liquor. It is a quarter of an inch thick without the scaly exterior. The bark is pale-coloured, and worthy of some attention, although it is inclined to be fibrous.

Confined to New South Wales; found on the Blue Mountains and its spurs as far as Mounts Wilson and Tomah (chiefly in gullies and along water-courses), and in mountainous country no great distance south of Sydney—*e.g.*, West Bargo gullies, Picton, Mittagong, &c.

A. leiophylla, Benth. (*A. saligna*, Wendl.).

"WEEPING WATTLE."

In south-west Australia it is the principal source of tan-bark, and is said to contain nearly 30 per cent. of tannic acid. It is a small tree, common in most parts of extra-tropical West Australia—at least towards the coast. (Mueller.)

It grows rapidly in the Sydney and Gosford districts. A specimen of bark, very thin, taken from a three-year-old sapling grown at the North Shore, Sydney, stripped in June, and analysed the following February, gave the very promising result of 28 per cent. of tannic acid, and 46·15 per cent. of extract. It is quite worthy of more extended trial in New South Wales.

This is the only non-N.S.W. wattle enumerated in this work, and cognizance is taken of it because of the wide-spread belief (even in our State) that it is a N.S.W. wattle, although often cultivated here because of its rapid growth and ornamental appearance. This belief also prevails in South Africa, where it is known as "Port Jackson Willow."

PART III.

Notes on New South Wales Wattles.

A few General Remarks on Morphology.

THE word wattle is one which we in Australia have peculiarly adopted as our own, and this is how it has come about: It dates from Anglo-Saxon times, and signifies twigs or saplings, or flexible rods plaited or interwoven together. The word has survived (chiefly in provincial dialects) to modern days, and when the early settlers of this State found it convenient to construct the framework of the walls of their dwellings and other buildings of twigs and split saplings, the operation was called "wattling," and the material used, "wattle." Near Sydney Cove there grew in abundance, overhanging the water-courses, a small tree with thin, flexible stems, which was frequently used for the purpose, and hence was called first "Wattle" or "Black Wattle." It is known to botanists as *Callicoma*,* and has cream-coloured flowers, in globular heads. Subsequently other plants, which we now call *Acacias*, were used for the purpose, and these are recognised as "Wattles" in most parts of this continent, whether their stems and twigs are used for wattling or not, while the name, as applied to *Callicoma*, has almost fallen into disuse, except amongst a few old-fashioned people.

The term wattle is, however, by no means universally applied to plants of the genus *Acacia*, particularly in the far western parts of the State. Myall, boree, mulga, brigalow, cooba, dead-finish, gidgee, hickory, miljee, umbrella-bush, wait-a-while, and yarran, amongst others, are all members of the great wattle family. (See Index for vernacular names).

The origin of the name *Acacia* is not absolutely free from doubt, but the most reasonable derivation indicates that it comes from the Greek *akazo*, I sharpen, in allusion to the sharp spines of many of the African and Asiatic species, which are, however, not characteristic of most of the Australian ones.

Acacias are found in the warmer regions of the earth, particularly in Australia and Africa. They aggregate nearly 500 species for the whole world, of which considerably over 300 are found in Australia alone. It will, therefore, be seen that *Acacia* is mainly Australian. The number of species can only be stated approximately, as botanists continue to discover additional ones.

Having spoken thus generally, let us consider details. First let us examine the blossoms. It will be found that wattles fall into two great groups—those which have their flowers in small round heads or fluffy balls, and those in which the shape of the flowers may be described as short, blunt rods, or technically speaking, "spikes." Now, if we look at the blossom with a

* *Callicoma*, from the Greek *kalos*, beautiful, and *kome*, hair, in allusion to the appearance of the heads of flowers.

pocket lens, we shall observe that it consists of a very large number of tiny flowers, forming, in fact, a colony of little flowerets, whose structure, though minute, is as perfect as that of a large, showy *Hibiscus* so common in gardens. These minute flowers will be found each to contain perfect sepals* (and, therefore, calyx), petals (and, therefore, corolla), a large number of stamens, together with a pistil. The tiny sepals and petals differ amongst themselves in shape, texture, markings, in the presence or absence of hairs; and as these characters often determine the species, it follows that it may be necessary for the botanist to examine minutely a plant submitted for his opinion.

The colour of wattle-blossoms varies from a pure white to a deep yellow, different species showing flowers of varying shades of cream-colour and pale yellow. As a rule, they do not show to advantage as cut flowers, their exquisite fluffiness departing as soon as they are removed from the plant.

Most of us are aware that the fruit of the wattle is a pod or legume, which, although varying a good deal in shape in different species, bears a strong family likeness to the homely pea or bean. Hence it is that the wattle belongs to the natural order *Leguminosæ*.† In some seasons the conditions for forming pods are unfavourable over large areas, and hence we may look for them in vain, but those of the ornamental wattles are well worthy of collection, as these plants are best propagated from seed; and here it may be mentioned that the outer coat of the wattle-seed is very tough and impervious to moisture, so that it does not germinate very readily. Accordingly, before sowing, we soak the seed in hot, nearly boiling water, or partly bake them, an operation which nature herself often performs by means of bush-fires. Wattle-seed may, in dry grass-land, remain in the ground for very many years, but if a fire passes over the country a crop of young wattles is frequently a result.

If I were to say that most wattles have no leaves, my readers would think I was not speaking seriously. The feathery foliage of the black and silver wattle, finely divided so as to be almost fern-like, consists of true leaves, but most of our wattles have "leaves," which structurally are only leaf-stalks or petioles flattened out, forming what are known as "phyllodia."‡

Many of these phyllodia look like the leaves of other trees—gum-trees for instance, other are long and narrow like a tape, while a number are thin and pungent-pointed, like needles. Most are quite green, but others look as if they have been dusted over with flour; in a word, it may be said that the shape, texture, markings, and other characteristics of these phyllodia present almost endless diversity of appearance.

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* *Calyx.*—The outer or lower whorl of a flower. Greek *kalyx*, a cup, in allusion to the usual shape.

Sepal.—Latin *sepio*, I enclose; an individual leaf of a calyx.

Corolla.—The whorl within or above the calyx. Usually bright coloured. Latin *Corolla*, a little crown (dim. of *corona*).

Petal.—Greek *petalon*, a leaf. An individual leaf of a Corolla.

Stamen.—An inner whorl of the flower. In some cases the stamens are present in one flower, while the pistil occurs in another. Stamens consist of filaments terminated by anthers.

Pistil.—The innermost whorl of many plants. When mature it is converted into fruit, and contains the seeds. Latin *pistillum*, a pestle, in allusion to its usual shape.

† *Leguminosæ* (Latin *legumen, inis*), all manner of pulse, as peas, beans, &c.

‡ *Phyllodia*, Greek, *phu(y)llon*, a leaf; *oidos*, like.

Phyllodinous Acacias have true leaves when they are very young seedlings, and some species belonging to the same category also have a greater or less tendency to the formation both of true leaves and *phyllodes*. This variation appears often to puzzle beginners in wattle growing. For example, *Acacia pycnantha* produces pinnate leaves in the seedling state, and I have received complaints such as the following :—" The seeds sent as *pycnantha* are coming up *decurrens*." Again, people accustomed to *decurrens* want reminding that there are wattles with other kinds of foliage. Here are the exact words of an anxious correspondent, and doubtless others have felt the same difficulty. I may mention that a trial package of *pycnantha* seed had been sent to him.

" I planted the seed according to directions. They duly germinated. When about 2 inches high the wattle leaves appeared to merge into gum leaves (*phyllodes*, J.H.M.), at the upper ends of which wattle leaves afterwards sprang out, and now many of the plants look more like young gum-trees than wattle-trees. Would you kindly inform me if this is the manner in which the true South Australian wattle grows, or have the plants I have raised become inoculated ?"

The whole family of Acacias is divided into two main groups, according to the structure of their leaves :—

1. *Phyllodineæ* (the *phyllodinous* section is typically Australian).—Those which have the true leaves, to speak more precisely, *phyllodes* in reality formed by the confluence of leaflets, stalklets, and stalks, replaced by *phyllodes*. The first leaves put forth will be found to be compound, consisting of several leaflets succeeding each other on each side of the midrib or petiole, and being compared to the branches of a feather, have received the name of pinnæ, and the whole said to be pinnate.

The diagram herewith will, perhaps, make the matter of *Acacia phyllodes* more clear. I may mention that the metamorphosis described is characteristic of nearly 280 out of about 300 known species of this genus.

2. *Bipinnatæ*.—Under this heading are included the *Acacias* which never develop *phyllodes*, but bear true leaves through all stages of growth.

Wattles commonly develop small point-like thickenings on the *phyllodes* or leaflets. These are glands, and are considered by some botanists to be nectaries—*e.g.*, Strasburger, fig. 48.

Wattles vary much in size when fully grown. Some tiny species hardly exceed 3 or 4 inches in height, and may be crushed like the grass of the field ; Most of them are shrubs, or trees of moderate size, while at least two species attain the stature of large forest trees, both of them being found to measure up to nearly 4 feet in diameter, while one has been found to attain a height of over 100 feet, and the other the extraordinary height of 150 feet.

As has been already hinted, the wattle may reasonably be looked upon as a national Australian plant, and hence it would behove boys and girls to set about the very pleasant task of studying it. The structure of the flowers, pods, and phyllodia should be made out from actual examination of a twig ; this will impress the subject on one's memory better than endless reading of descriptions.

The wattle is essentially a flower of winter or early spring, and its cultivation is easy. It brightens up our gardens and roadsides at a season when there are few other flowers, and no flowers are more effective than yellow ones. When these facts are realised we shall see more wattles adorning the homes of this bright sunny land than we do at present, for they are themselves an emblem of sunshine.

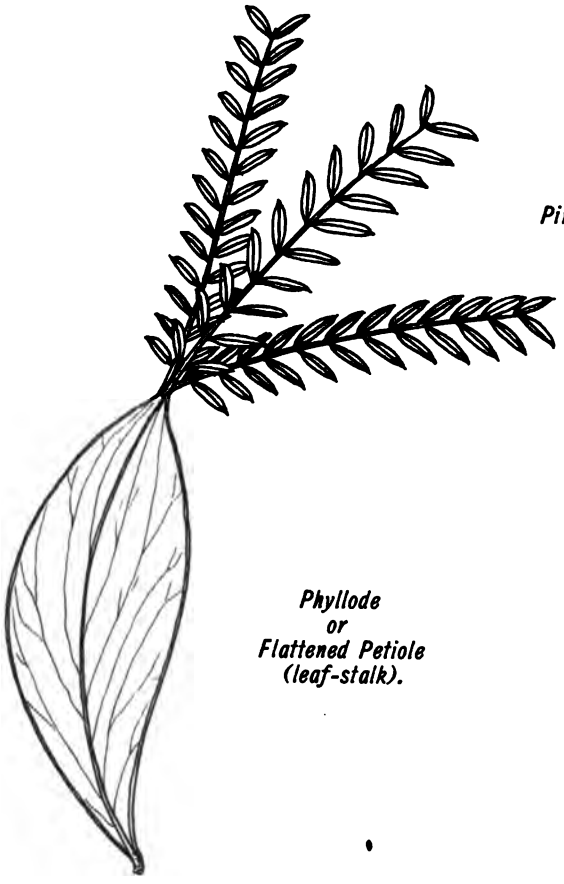

DIAGRAM to show Metamorphosis of Wattle Leaves.

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WATTLES AND THE POETS.

Wattles of various kinds are so characteristic of Australia that I fully expected they would have strongly appealed to the poets, for many are shapely shrubs or small trees, gorgeous when in bloom, and often emit a dainty perfume; yet, as a rule, the allusions to them are quite scanty—mere passing references—rarely influencing the context.

Wattles are almost the only plants to which Gordon alludes, and he devotes a whole poem (one of his shorter ones) to them. It is "Whisperings in Wattle-boughs," and begins—

> "Oh, gaily sings the bird! and the wattle boughs are stirred
> And rustled by the scented breath of spring."

In "Wormwood and Nightshade" he has—

> "Through the blackwood's emerald bough."

the blackwood being, of course, a wattle.

In "Ye Wearie Wayfarer" he says—

> "'Tis the fragrance rare that the bushman knows,
> The scent of the wattle-bloom."

and again—

> . . . "the golden-tufted wattle."

The brilliant yellow of the flowers of many of the wattles is also alluded to by Harpur in his "Early Summer,"—

> "And upland growths of wattle engolden all the view."

Victor Daley has caught the spirit of some of the graceful pendulous wattles which line our watercourses, when in his "River Maiden," he sings of—

> "The light mimosas bended low."

Mulgas and myalls are, of course, wattles also, but our poets, while mentioning them, have not yet learned to linger over them.

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NEW SOUTH WALES ACACIAS, ARRANGED IN BOTANICAL SEQUENCE.

Acacia, Linn. after Tournef. Inst. 605, t. 375 (1700)

Section i.—Continuæ—

1. *continua*, Benth., B. Fl., ii, 322 (1864). — B. Fl., ii, 322

Section ii.—Pungentes—

2. *spinescens*, Benth., in Hook. Lond. Journ., i, 323 (1842). — B. Fl., ii, 323
3. *lanigera*, A. Cunn., in Field New South Wales, 345 (1825). Proc. Linn. Soc., N.S.W., Vol. x (1895), p. 382, t. 27. — B. Fl., ii, 324
   var. *venulosa*, F.v.M., impl. from i, Census (*A. venulosa*, Benth., in Hook. Lond. Journ., i, 366). — B. Fl., ii, 388
4. *Bäuerleni*, Maiden and Baker in Proc. Linn. Soc., N.S.W., Vol. xx (1895), p. 583.
5. *pumila*, Maiden and Baker in Proc. Linn. Soc., N.S.W., Vol. xx (1895), p. 385.
6. *trinervata*, Sieb., in DC. Prodr., ii, 451. (1825) — B. Fl., ii, 325
   var. *angustifolia*, Benth.* — B. Fl., ii, 325
7. *colletioides*, A. Cunn., in Hook. Lond. Journ., i, 336 (1842) — B. Fl., ii, 325
   var. *nyssophylla*, Benth., B. Fl., ii, 326
8. *siculiformis*, A. Cunn., in Hook. Lond. Journ., i, 337 (1842). — B. Fl., ii, 329
9. *tetragonophylla*, F.v.M., in Journ. Linn. Soc., iii, 121 (1858). — B. Fl., ii, 330
10. *juniperina*, Willd., Spec. Plant., iv, 1,049 (1805). — B. Fl., ii, 331
    var. *Brownei*, Benth., B. Fl., ii, 332.
11. *asparagoides*, A. Cunn., in Field, N.S.W., 343 (1825). — B. Fl., ii, 332
12. *diffusa*, Edw., Bot. Reg., t. 634 (1822). — B. Fl., ii, 332
13. *rhigiophylla*, F.v.M., Benth., in *Linnea*, xxvi, 611. — B. Fl., ii, 333

Section iii.—Calamiformes—

14. *rigens*, A. Cunn., in Lond. Hort. Brit., ii, 406 (1830). — B. Fl., ii, 337
15. *pugioniformis*, Wendl., Comm. de Acac. aphyll. 38, t. 9 (1820). (Proc. Linn. Soc., N.S.W., vol. vii (1892), t. 8.) — B. Fl., ii, 338
16. *juncifolia*, Benth., in Hook. Lond. Journ., i, 341 (1842) — B. Fl., ii, 339
    var. *planifolia*, Benth., B. Fl., ii, 339.
17. *calamifolia*, Sweet, in Bot. Reg., t. 839 (1824). — B. Fl., ii, 339
18. *scirpifolia*, Meissn., in Bot. Zeit., 10 (1855). — B. Fl., ii, 339

* I have never been able to find this variety, and it seems to me not unlikely that it may be identical with an Acacia, not uncommon in swampy localities in the Blue Mountains, which I take to be a narrow-leaved form of *A. elongata*, Sieb.

NEW SOUTH WALES ACACIAS, ARRANGED IN BOTANICAL SEQUENCE—*continued.*

Section iv.—Brunioideæ—

19. *Baueri*, Benth., in Hook. Lond. Journ., i, 344 (1842). B. Fl., ii, 342
20. *brunioides*, A. Cunn., in G. Don. Gen. Syst., ii, 404 (1832). B. Fl., ii, 343
21. *conferta*, A. Cunn., in Hook. Lond. Journ., i, 345 (1842). B. Fl., ii, 343

Section v.—Uninerves—

Undersection i.—Armatæ—

22. *aspera*, Lindl., in Mitch. Three Exped. ii, 139 (1838). B. Fl., ii, 347
23. *armata*, R. Br., in Ait. Hort., Kew, sec. ed., v, 463 (1813). B. Fl., ii, 347

Undersection ii.—Triangulares—

24. *vomeriformis*, A. Cunn., in Hook. Lond. Journ., i, 332 (1842). B. Fl., ii, 350
25. *plajiophylla*, F.v.M., in Journ. Linn. Soc., iii, 131 (1858). (*A. undulifolia*, Fras. var. ? B. Fl., ii, 356).
26. *acanthoclada*, F.v.M., Fragm., iii, 127 (1863). B. Fl., ii, 352

Undersection iii.—Brevifoliæ—

27. *obliqua*, A. Cunn., in Hook Lond. Journ., i, 334 (1842). B. Fl., ii, 353
28. *acinacea*, Lindl., in Mitch. Three Exped., ii, 267 (1838). B. Fl., ii, 353
29. *lineata*, A. Cunn., in G. Don. Gen. Syst., ii, 403 (1832). (*A. runciformis* A. Cunn., in G. Don. Gen. Syst., ii, 404, 1832). B. Fl., ii, 353
30. *hispidula*, Willd. Spec. Plant., iv, 1,054 (1805). B. Fl., ii, 355
31. *undulifolia*, Fras., in Lodd. Bot. Cab., xvi, 1,544 (1829). B. Fl., ii, 355
var. *sertiformis*, Benth., B. Fl., ii, 356.
var. *dysophylla*, Benth., B. Fl., ii, 356.
var. *humilis*, Benth., B. Fl., ii, 356.
var. *pubescens*, Maiden and Baker, Proc. Linn. Soc., N.S.W., ser. ii, vol. ix, p. 459.
32. *flexifolia*, A. Cunn., in Hook. Lond. Journ., i, 359 (1842). B. Fl., ii, 356

Undersection iv.—Angustifoliæ—

33. *microcarpa*, F.v.M., Sec. Gen. Rep., 7 (1854). B. Fl., ii, 357
34. *montana*, Benth., in Hook. Lond. Journ., i, 360 (1842). B. Fl., ii, 357
35. *verniciflua*, A. Cunn, in Field, N.S.W., 344 (1825). B. Fl., ii, 358
36. *leprosa*, Sieb., in DC. Prodr., ii, 450 (1825). B. Fl., ii, 358
37. *stricta*, Willd., Spec. Plant., iv, 1.052 (1805). B. Fl., ii, 358
38. *Gnidium*, Benth., B. Fl., ii, 359 (1864), var. *latifolia*, Maiden and Betche. Proc. Linn. Soc., N.S.W., Sept., 1905. B. Fl., ii, 359
39. *sentis*, F.v.M., Sec. Gen. Rep., 11 (1854). B. Fl., ii, 360
40. *fasciculifera*, F.v.M., in B. Fl., ii, 361 (1864). B. Fl., ii, 361

Undersection v.—Racemosæ—

41. *falcata*, Willd., Spec. Plant., iv, 1,053 (1805). B. Fl., ii, 361
42. *penninervis*, Sieb.,* in DC. Prodr., ii, 452 (1825), incl. var. *falciformis*, Benth., B. Fl., ii, 362. B. Fl., ii, 362
var. *lanceolata*, R. T. Baker.* Proc. Linn. Soc., N.S.W., vol. xxi (1896), p. 441.
var. *glauca*, R. T. Baker, l.c.
var. *angustifolia*, Maiden, *supra*, p. 49.
43. *difformis*, R. T. Baker, in Proc. Linn. Soc., N.S.W., vol. xxii (1897), p. 154.
44. *neriifolia*, A. Cunn., in Hook. Lond. Journ., i, 357 (1842). B. Fl., ii, 363
45. *pycnantha*, Benth., in Hook. Lond. Journ., i, 351 (1842). B. Fl., ii, 365
46. *notabilis*, F.v.M., Fragm., i, 6 (1858). B. Fl., ii, 365
47. *gladiiformis*, A. Cunn., in Hook. Lond. Journ., i, 354 (1842). B. Fl., ii, 365
48. *obtusata*, Sieb., in DC. Prodr., ii, 453 (1825). B. Fl., ii, 366
49. *rubida*, A. Cunn., in Field, N.S.W., 344 (1825). B. Fl., ii, 366
50. *Dorothea*, J. H. Maiden, in Proc. Linn. Soc., N.S.W., vol. xxvi (1901), p. 12; vol. xxix (1904), p. 740.
51. *amoena*, Wendl., Comm. de Acac. aphyll., 10, t. 4 (1820). B. Fl., ii, 366
52. *hakeoides*, A. Cunn., in Hook. Lond. Journ., i, 354 (1842). B. Fl., ii, 367
53. *salicina*, Lindl., in Mitch. Three Exped., ii, 20 (1838). B. Fl., ii, 367
54. *suaveolens*, Willd., Spec. Plant., iv, 1,050 (1805). B. Fl., ii, 369
55. *leptopetala*, Benth., in Linnæa, xxvi, 619 (1853); Proc. Linn. Soc., N.S.W., vol. xxv (1900), p. 660. B. Fl., ii, 370
56. *Murrayana*, F.v.M., in B. Fl., ii, 370 (1864). B. Fl., ii, 370

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* See p. 97.

NEW SOUTH WALES ACACIAS, ARRANGED IN BOTANICAL SEQUENCE—*continued.*

Undersection v.—Racemosæ—*continued.*

57. *subulata*, Bonpl., Jard. Malm., 110, t. 45 (1813).* — B. Fl., ii, 370
58. *linifolia*, Willd., Spec. Plant., iv, 1,051 (1805). — B. Fl., ii, 371
var. *prominens*, F.v.M., impl. from i, Census (*A. prominens*, A. Cunn.).† — B. Fl., ii, 371
59. *buxifolia*, A. Cunn., in Field, N.S.W., 344 (1825). — B. Fl., ii, 372
var. *decora*, F.v.M., implied from i, Census (*A. decora*, Reichb.). — B. Fl., ii, 372
var. *neglecta*, var. nov.; *A. neglecta*, Maiden and Baker, Proc. Linn. Soc., N.S.W., vol. ix, sec. series (1894), p. 163, t. xiii. See below, p. 68.
60. *lunata*, Sieb., in DC. Prodr., ii, 452 (1825), Proc. Linn. Soc., N.S.W., vol. xxiv (1899), p. 661. — B. Fl., ii, 373
var. *crassiuscula* (*A. crassiuscula*, Benth., non Wendl., in B. Fl., ii, 372).
61. *brachybotrya*, Benth., in Hook. Lond. Journ., i, 347 (1842). — B. Fl., ii, 373
var. *glaucophylla*, Benth., B. Fl., ii, 374.
var. *glabra*, Benth., B. Fl., ii, 374.
62. *podalyriæfolia*, A. Cunn., in Loud. Hort. Brit., 707 (1830). — B. Fl., ii, 374
63. *vestita*, Edw., in Bot. Reg., t. 698 (1823). — B. Fl., ii, 375
64. *cultriformis*, A. Cunn., in G. Don. Gen. Syst., ii, 406 (1832). — B. Fl., ii, 375
65. *pravissima*, F.v.M., First Gen. Rep., 12 (1853). — B. Fl., ii, 375
66. *myrtifolia*, Willd., Spec. Plant., iv, 1,054 (1805). — B. Fl., ii, 376

Section vi.—Plurinerves—

Undersection i.—Triangulares—

67. *pravifolia*, F.v.M., Fragm., i, 4 (1858).
68. *sublanata*, Benth., in Hueg. enum., 42 (1837). — B. Fl., ii, 378
69. *amblygona*, A. Cunn., in Hook. Lond. Journ., i, 332 (1842). — B. Fl., ii, 378

Undersection ii.—Oligoneura—

70. *trineura*, F.v.M., *Pl. Vict.*, ii, 25, and *Fragm.*, iv, 5. — B. Fl., ii, 381
71. *elongata*, Sieb., in DC. Prodr., ii, 451 (1825). — B. Fl., ii, 381
72. *Dawsoni*, R. T. Baker, in Proc. Linn. Soc., N.S.W., vol. xxii (1897), p. 153.
73. *subporosa*, F.v.M., Pl. of Vict., ii, 24 (1860). — B. Fl., ii, 382
var. *linearis*, Benth., B. Fl., ii, 382.

Undersection iii.—Microneura—

74. *homalophylla*, A. Cunn., in Hook. Lond. Journ., i, 365 (1842). — B. Fl., ii, 383
75. *Cambagei*, R. T. Baker, in Proc. Linn. Soc., N.S.W., 1900, p. 661, t. 42.
76. *pendula*, A. Cunn., in Lond. Hort. Brit., 490 (1830). — B. Fl., ii, 383
77. *Oswaldi*, F.v.M., Pl. of Vict., ii, 27 (1860). — B. Fl., ii, 384
78. *coriacea*, DC. Mém. sur la Fam. des Légum, 446 (1825). — B. Fl., ii, 385
79. *stenophylla*, A. Cunn., in Hook. Lond. Journ., i, 366 (1842). — B. Fl., ii, 385

Undersection iv.—Nervosæ—

80. *sclerophylla*, Lindl., in Mitch. Three Exped., ii, 138 (1838). — B. Fl., ii, 386
81. *farinosa*, Lindl., in Mitch. Three Exped., ii, 145 (1838). — B. Fl., ii, 386
82. *viscidula*, A. Cunn., in Hook. Lond. Journ., i, 366 (1842). — B. Fl., ii, 387
83. *ixiophylla*, Benth., in Hook. Lond. Journ., i, 364 (1842). — B. Fl., ii, 387
84. *melanoxylon*, R. Br., in Ait. Hort. Kew., sec. ed., v, 462 (1813). — B. Fl., ii, 388
85. *implexa*, Benth., in Hook. Lond. Journ., i, 368 (1842). — B. Fl., ii, 389
86. *harpophylla*, F.v.M., in Benth., Fl. ii, 389 (1864), Proc. Linn. Soc., N.S.W., vol. ix (1894), p. 459. — B. Fl., ii, 389
87. *excelsa*, Benth., in Mitch. Trop. Austr., 225 (1848), Proc. Linn. Soc., N.S.W. (1900), p. 662. — B. Fl., ii, 390
88. *complanata*, A. Cunn., in Hook. Lond. Journ., i, 369 (1842). — B. Fl., ii, 390

Undersection v.—Dimidiatæ—

89. *binervata*, DC., Prodr., ii, 452 (1825). — B. Fl., ii, 390
90. *Bakeri*, Maiden in Proc. Linn. Soc., N.S.W., vol. x (1895), p. 337.
91. *flavescens*, A. Cunn., Benth., in *Hook. Lond. Journ.*, i, 381 (doubtful as a N.S.W. plant at present, for the reason given at p. 74). — B. Fl., ii, 391

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* Omitted by Mueller in his Census, who probably regarded it as a form of *A. linifolia*, A Cunn., but the seeds, which were not known to Mueller, confirm it as a distinct species. See Proc. Linn. Soc., N.S.W., vol. viii, sec. series (1893), p. 237, t. ix.

† The differences between the broader-phyllode forms of var. *prominens* and of *A. lunata* require to be worked up.

NEW SOUTH WALES ACACIAS, ARRANGED IN BOTANICAL SEQUENCE—*continued.*

Section vii.—Juliferæ—

92. *triptera*, Benth., in Hook. Lond. Journ., i, 325 (1842). B. Fl., ii, 323
var. *Lyndoni*, R. T. Baker, in Proc. Linn. Soc., N.S.W., vol. xxii (1897), p. 696, t. xxv.
93. *oxycedrus*, Sieb., in DC. Prodr., ii, 453 (1825). B. Fl., ii, 334
94. *verticillata*, Willd. Spec. Plant., iv, 1,049 (1805). B. Fl., ii, 334
95. *pycnostachya*, F.v.M., Pl. of Vict., ii, 33 (1860). B. Fl., ii, 396
96. *subtilinervis*, F.v.M., Pl. of Vict., ii, 32 (1860). B. Fl., ii, 396
97. *alpina*, F.v.M., Fragm., iii, 129 (1863), Proc. Linn. Soc., N.S.W. (1897), p. 148. B. Fl., ii, 397
98. *longifolia*, Willd. Spec. Pl., iv, 1,052 (1805). B. Fl., ii, 397
var. *Sophoræ*, F.v.M., Pl. Vict., ii, 30.
var. *floribunda*, F.v.M., Pl. Vict., ii, 31.
var. *prostrata*, C. Moore and Betche, in Handb. Fl., N.S.W., p. 170.
var. *Bylongensis*, R. T. Baker, Proc. Linn. Soc., N.S.W., vol. xxi, p. 443 (1896).
99. *linearis*, Sims. Bot. Mag., t. 2,156 (1820). B. Fl., ii, 399
100. *Burkitti*, F.v.M., in B. Fl., ii, 400 (1864). B. Fl., ii, 400
101. *cyperophylla*, F.v.M., in B. Fl., ii, 400 (1864). B. Fl., ii, 400
102. *aneura*, F.v.M., in Linnæa, xxvi, 627 (1853). B. Fl., ii, 402
var. *brachystachya*, F.v.M., impl. from i, Census (*A. brachystachya*, Benth., B. Fl., ii, 403).
103. *cibaria*, F.v.M., in Melb. Chemist, July, 1882.
104. *Kempeana*, F.v.M., in Melb. Chemist, July, 1882.
105. *doratoxylon*, A. Cunn., in Field, N.S.W., 345 B. Fl., ii, 403
var. *ovata*, Maiden and Betche. Proc. Linn. Soc., N.S.W., Sept. (1905).
106. *glaucescens*, Willd. Spec. Plant., iv, 1,052 (1805). B. Fl., ii, 406
107. *Maideni*, F.v.M., Linn. Soc., N.S.W., Macleay Mem. Vol. (1893). Proc. Linn. Soc., vol. xxii (1897), p. 232.
108. *Cunninghamii*, Hook. Icon. Plant., t. 165 (1837). B. Fl., ii, 407
var. *longispicata*, Benth., B. Fl., ii, 407.
109. *aulococarpa*, A. Cunn., in Hook. Lond. Journ., i, 387 (1842). Proc. Linn. Soc., N.S.W., vol. x (1895), p. 513. B. Fl., ii, 410

Section viii.—Bipinnatæ—

110. *elata*, A. Cunn., in Hook. Lond. Journ., i, 383 (1842). B. Fl., ii, 413
111. *pruinosa*, A. Cunn., in Hook. Lond. Journ., i, 383 (1842). B. Fl., ii, 413
112. *spectabilis*, A. Cunn., in Hook. Lond. Journ., i, 383 (1842). B. Fl., ii, 413
var. *Stuartii*, Benth., B. Fl., ii, 413.
113. *Baileyana*, F.v.M., in Trans. Roy. Soc. of Vict., xxiv, 168 (1887).
114. *Jonesii*, F.v.M. and Maiden, in Proc. Linn. Soc. N.S.W (1893), p. 13.
115. *Muelleriana*, Maiden and R. T. Baker, in Proc. Linn. Soc., N.S.W., vol. viii (1893), p. 515, t. xxv.
116. *polybotrya*, Benth., in Hook. Lond. Journ., i, 384 (1842). B. Fl., ii, 414
var. *foliosa*, Benth., B. Fl., ii, 414.
117. *discolor*, Willd. Spec. Plant., iv, 1,068 (1805). B. Fl., ii, 414
var. *angustifolia*, Benth., B. Fl., ii, 414.
118. *decurrens*, Willd. Spec. Plant., iv, 1,872 (1805). B. Fl., ii, 414
var. *pauciglandulosa*, F.v.M., in B. Fl., ii, 415.
var. *Leichhardtii*, Benth., B. Fl., ii, 415.
var. *Deanei*, R. T. Baker, Proc. Linn. Soc., N.S.W., vol. xxi (1896), p. 348.
var. *mollis*, Lindl. *Bot. Reg.*, t. 371 (*A. mollissima*, Willd. Enum. Pl. Hort. Berol., 1,053 (1809). B. Fl., ii, 415
var. *dealbata*, F.v.M. (*A. dealbata*, Link. Enum. Pl. Hort. Berol., 445, 1822). B. Fl., ii, 415
var. *lanigera*, Maiden, *supra*, p. 41.
119. *cardiophylla*, A. Cunn., in Hook. Lond. Journ., i, 385 (1842). B. Fl., ii, 415
120. *leptoclada*, A. Cunn., in Hook. Lond. Journ., i, 385 (1842). B. Fl., ii, 416
121. *pubescens*, R. Br., in Ait. Hort., Kew., sec. ed., v, 464 (1813). B. Fl., ii, 416
122. *Farnesiana*, Willd. Spec. Plant., iv, 1,083 (1805). B. Fl., ii, 419

Notes on the species of New South Wales Acacias, arranged in alphabetical order.

Brief notes are given as to the range of each species, and other particulars. These field-notes will, I hope, be found of use. Initials are given of some collectors of species in the National Herbarium, Sydney (Nat. Herb., Syd.) It is hoped the specific localities quoted will be useful. The full names corresponding to the initials are as follows :—

A

J.S.A.—Allan ; T.V.A.—Alkin ; E.C.A.—Andrews.

B

E.B.—Betche ; J.L.B.—Boorman ; R.T.B.—Baker ; K.H.B.—Bennett ; G.R.B.—Brown ; W.B.—Baeuerlen ; M.B.—Bell ; W.F.B.—Blakeley ; F.M.B.—Bailey ; H.B.—Dr. Beckler ; H.H.B.—Bennett ; J.B.—Backhouse.

C

R.H.C.—Cambage ; P.C.—Corbett ; A.C.—Cunningham ; J.V.deC.—de Coque ; R.A.C.—Campbell ; J.H.C.—Camfield ; W.S.C.—Campbell ; J.W.C.—Cox ; J.D.C.—Cox ; J.M.C.—Curran ; A.R.C.—Crawford ; E.C.—Cheel ; J.E.C.—Carne ; W.J.C.—Cahill ; J.F.C.—Campbell ; R.W.C.—Campbell.

D

J.D.—Duff ; J. Dawson, written in full ; W.D.—Dunn ; H.D.—Deane ; G.D.—Day ; C.D.—Darley.

E

R.E.—Etheridge.

F

J.J.F.—Fletcher ; W.F.—Forsyth ; C.F., Jr.—French ; W.W.F.—Froggatt ; F.F.—Ferguson.

G

J.G.—Gregson ; J. Geddes written in full ; G.S.M.G.—Grant ; T.H.G.—Grieve ; A.G.—Gale.

H

G.S.H.—Home ; R.H.—Helms ; A.A.H.—Hamilton ; A.G.H.—Hamilton ; W.H.—Heron ; A.J.H.—Holloway ; A.W.H.—Howitt.

K

T.K.—Kidston ; M.K.—Koch ; E.K.—Kilner ; H.K.—Kendall.

L

A.C.L.—Loder ; S.L.—Lyndon ; H.L.—Lau.

M

C.M.—Moore ; A.W.M.—Mullen ; A.M.—Murphy ; G.V.M.—Mocatta ; F.B.M.—Mulligan ; J.M.—Martin ; J.H.M.—Maiden ; H.H.M.—Maiden ; W.M.—Mecham.

Mc

T.McN.—McNamara ; W.McD.—McDonald.

O

E.P.O'R.—O'Reilly ; A.O.—Osborne ; E.O.—Officer.

P

R.W.P.—Peacock ; J.G.P.—Postlethwaite ; S.P.—Payten.

R

E.F.R.—Rogers ; H.M.R.R.—Rupp ; A.R.—Rudder ; J.H.R.—Rumsey ; H.J.R.—Rumsey.

S

T.G.S.—Sloane ; C.S.—Stuart ; W.T.S.—Seaward ; A.R.S.—Samuels ; L.S.—Stephenson ; B.S.—Baldwin Spencer ; J.S.—Staer ; H.W.S.—Smith ; W.J.S.—Smith.

T

N.T.—Taylor; F.R.T.—Taylor

V

J.V.—Vernon.

W

C.W.—Wilhelmi; W.W.—Woolls; W.W.W.—Watts; H.L.W.—White.

Y

W.H.Y.—Yarrington.

Where it is stated that the seeds are eaten by the aborigines for food, their method of preparation is as follows:—A flat stone, usually of an oval shape, say 18 inches long by a foot wide, is taken, a few seeds thrown upon it, and the seeds partly pounded and partly rubbed into a fine powder, which forms a paste by the addition of a small quantity of water, as the operation of grinding proceeds. With the bare hand the pasty mass is swept off on to the hot ashes, and a coarse damper is prepared. The food thus prepared is more or less astringent and dirty-looking, and is admixed with the abraded portion of the stone.

26. *A. acanthoclada, F.v.M., Ic. Austr. Ac.†

A rigid divaricate spinescent shrub. "Murray Desert, Howitt's Expedition." (B.Fl. ii, 352‡) in search of Burke and Wills. Not in Nat. Herb., Syd. "Kielkoyne," the V. loc. given in B.Fl. is Kulkyne, between Euston, N.S.W.. and Mildura, V.

28. A. acinacea, Lindl., F.v.M., Ic. Austr. Ac.

A shrubby plant, very showy when in flower. A dry-country species, found in S.A., V., and N.S.W. Mulwala, T.G.S.; Wyalong, R.H.C.

97. A. alpina, F.v.M., Ic. Austr. Ac.

Summit of Mount Tabletop, near Kiandra (E.B.). Previously recorded from alpine summits of Victoria. In addition to Mount Tabletop it has been found on the top of two other mountains near Kiandra, always strictly confined to the wind-swept summit, where it forms dense patches, often more than 10 feet in diameter, and about two or three feet high.

69. A. amblygona, A. Cunn., F.v.M., Ic. Austr. Ac.

Q. and N.S.W. Low-growing shrub, but with wide, spreading habit. Dubbo and Harvey Range, J.H.M., J.L.B., and R.H.C.; Lake Cudgellico, G.S.H.; Murrumbo, R.T.B. One or two feet high, ramifying with long branches. Very showy when in full flower, Warialda, J.H.M., J.L.B.

51. A. amœna, Wendl.

This tall shrub yields a good bark, which would be valuable if it were of large size. As it is, when dried, it is of the size of cassia-bark or coarse cinnamon. It is smooth, and yields a pale-coloured. rather fibrous powder.

A sample from Tantawanglo Mountain, near Candelo, N.S.W., from shrubs 8 to 12 feet high, with a diameter of 2 to 4 inches, and grown in granite soil, afforded 23·5 per cent. of tannic acid, and 45·85 per cent. of extract. It was collected July, 1889, and analysed April, 1890.

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* The number preceding the species is that of the sequence number of the species given at pp. 58 to 61.

† Signifies "Iconography of Australian Acacias" (Mueller), where so many of the species are figured. After the name of each species will be found contracted references to other works giving illustrations of a particular wattle.

‡ B.Fl. signifies "Bentham's Flora Australiensis," and the references given are of the places at which botanical descriptions of the various wattles may be obtained.

Found in southern N.S.W. and V.; a coast and mountain species. Small erect tree. Steep side of Shoalhaven gullies, but (?) *A. rubida*, a species sometimes difficult to separate with imperfect material, C.M. Along banks of Wollondilly, at Burragorang, R.H.C.

102. A. aneura, F.v.M., Ic. Austr. Ac.; Turner, Forage Pl., p. 33; Maiden in *Agric. Gaz.*, viii (1897), p. 520; *Proc. Linn. Soc. N.S.W.* 1902, vol. xxvi, part 4, t. 31. (Photographs of trees.)

"MULGA."—The chief ingredient of Mulga scrub, so called from the Mulga, or long, narrow shield of wood made by the aborigines out of Acacia wood.

A specimen of the bark of this tree from Ivanhoe, *viâ* Hay, N.S.W., yielded 4·78 per cent. of tannic acid, and 10 per cent. of extract. A narrow-leaved variety (there is a form with much narrower leaves than the other), from the same neighbourhood yielded 20·72 per cent. of extract, and 8·62 per cent. of tannic acid. The former is a deeply-furrowed, flaky, pulverulent bark, apparently from an old tree; average thickness, $\frac{3}{8}$ inch. The bark of the narrow-leaved variety is a thin, poor bark, not exceeding $\frac{3}{16}$ inch in thickness, moderately fissured, of a dark-grey colour, sometimes nearly black. (*Proc. R.S., N.S.W.*, 1887, p. 32.)

A second sample of the normal species gave (*Proc. R.S., N.S.W.*, 1888, p. 271), 2·32 per cent. of tannic acid, and 12·12 per cent. of extract. It was from Tarella, Wilcannia; collected August, 1887; analysed August, 1888. A useless, flaky, dry-country bark.

An inland, desert species, found in all the States except Tasmania.

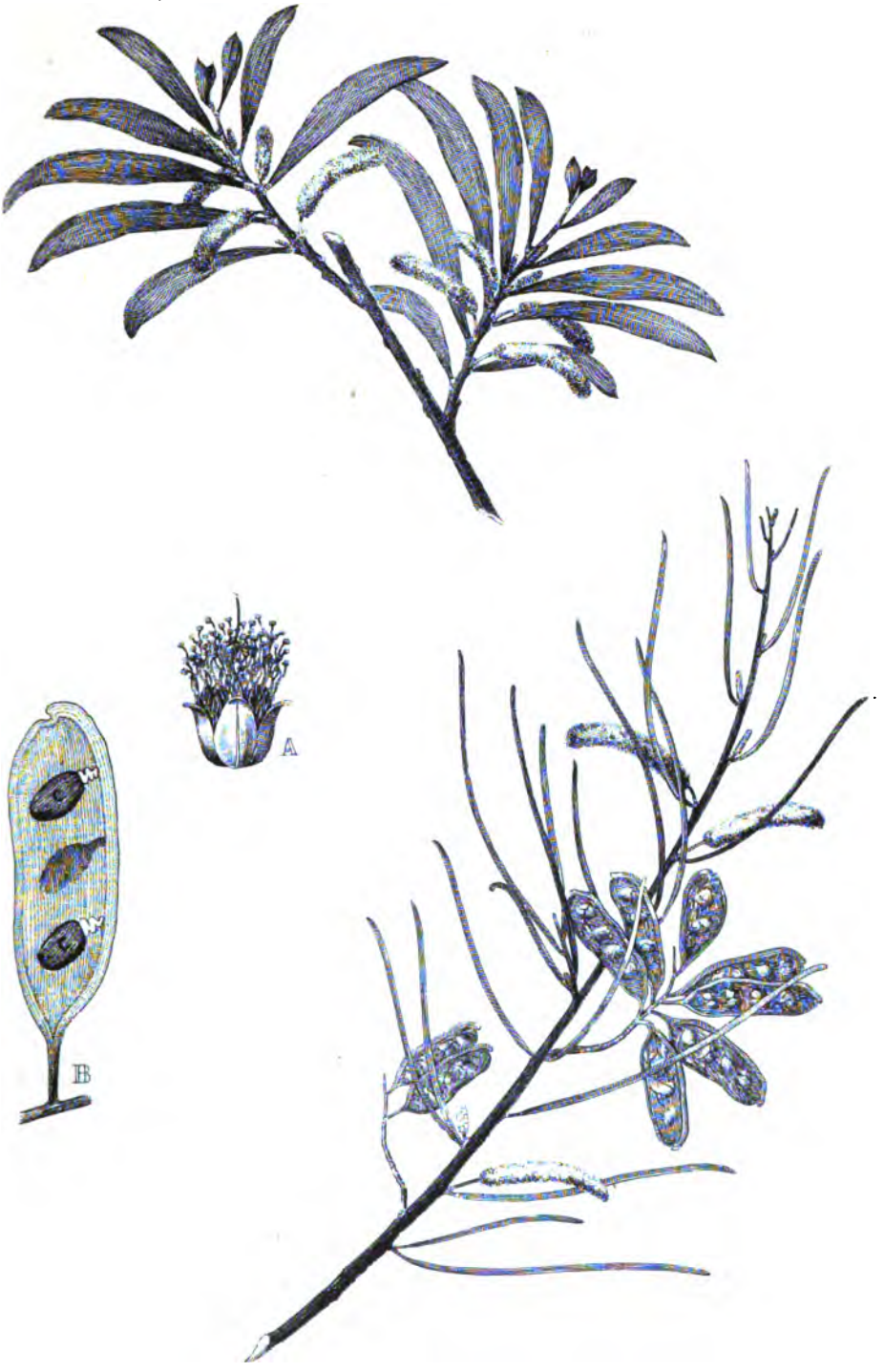
The leaves form one of our best western fodders. For an analysis of them by Guthrie, see *Agric. Gaz., N.S.W.*, Oct., 1899. The seeds used to be eaten by the blacks. The timber is useful for posts.

Following is an interesting note on Mulga, from the *Sydney Mail* in 1890, written by an author whose name I have lost:—

"We now come to the edible scrubs, which often, of necessity, take their place amongst the fodder plants of Australia. Amongst these, the most widespread and perhaps the best known is the mulga. On the southern flats of the main inland rivers, mulga grows as a low bushy tree, the branches commencing to spread some six feet from the ground. In the north it grows with a tall straight stem, 20 feet high, and is, therefore, quite unavailable as a fodder plant. On the west coast, and in the interior, it is a true scrub, attaining a good height, but branching out only a foot or two from the ground. Both here and on the lower courses of the rivers, it grows in open forest; to the north it is a thick scrub almost too dense to ride through. It is not by any means a barren scrub, good feed, both grass and herbage, being generally found within its limits. As a rule, it is only available for cattle, although the species found in Western Australia grows low enough for sheep to feed on. The utility of horns to cattle when scrub-feeding is soon apparent. An old bullock will twist down saplings and break down limbs of trees, and obtain a good meal where a polled beast would go hungry. Mulga is likely to become an important factor in the settlement of the interior, as it forms good fodder for camels, and, as they are certainly to be the beasts of burden and draught over the long dry stages of the heart of Australia, until superseded by steam and iron, the universal presence of the mulga will prove of some service. Mulga affects all kinds of soil. It is to be found on hard, gravelly ironstone ridges, on the dreaded sand-hills of the desert, and on the alluvial flats of the inland rivers."

Broken Hill, A.C.L.; Paldrumatta Bore and Mount Browne, P.C.; Tarcoon J.L.B.; Byrock, H.D.; Coolabah, R.W.P.; Nyngan, E.F.R.; "Up to a height of 25 feet. Wood very hard, and used greatly by natives for weapons, &c. Capable of high polish."—Ivanhoe, *via* Hay, K.H.B.

23. A. armata, R.Br., Bonpl. *Jard. Malm.*, t. 55; Engler, *Nat. Pflanzenfam*, iii, 3, p. 108, fig. 63; *Bot. Mag.* t. 1,653; Lodd. *Bot. Cab.*, t. 49. There is also a garden form figured in works under the name var. *angustifolia*.



ACACIA ANEURA, F.v.M.
MULGA.

"KANGAROO THORN."

The bark strips very easily, and the shrub never attains any size. The bark is, of course, thin; it is also smooth on the exterior, and of a light-brown colour. Externally the colour is of a dirty-grey, and has numerous transverse markings of a lighter colour. The bark appears to be characteristic of this species. As a tan bark it is useless, a specimen from Tomakin, Bateman's Bay, N.S.W., from trees 12 to 20 feet high, having a diameter of from 2 to 4 inches, collected 18th June, 1890, and analysed January, 1891, was found to contain only 3 per cent. tannic acid, and 18·15 per cent. extract.

It grows round swamps and near creeks along the sea-coast, and in coastal localities it appears seldom to occur further than about a mile from the sea. It is also an inland species. It is usually found in dense, almost impenetrable masses, which circumstance, added to its prickly nature, has given it its common name, and has also caused it to come into use for hedge-planting.

It is also found in all the States, except Tasmania.

Bulli, E.B.; Blue Mountains, J.J.F.; Perth, near Bathurst, J.L.B.; Caloola and Mount McDonald, R.H.C.; Harvey Range, in the better soil of the foot-hills, J.H.M., J.L.B.; Warrumbungle Range, W.F.; Parkes, J.H.M.; Wagga Wagga, R.H.; Murrumbo, R.T.B.; Page River, J.H.M.; Warrah, J.G.; Port Macquarie, G.R.B.

11. A. asparagoides, A. Cunn.

Small prickly shrub, reminding one of *A. juniperina.* Confined to N.S.W. Mount Wilson, J.H.M.; J.G.; Blackheath, A.A.H.

22. A. aspera, Lindl., F.v.M., Ic. Austr. Ac.

Dwarf acacia, with slightly hairy "leaves." V. and N.S.W. Wyalong, R.H.C. [Lachlan R., A.C.]

109. A. aulacocarpa, A. Cunn.

"HICKORY"—"Dilka," of the Portis Curtis blacks.—(Hedley.)

"Brush Ironbark." This tree yields a tan-bark, used in Queensland to some extent. A specimen received from Dr. T. L. Bancroft, who obtained it from Deception Bay, near Brisbane, gave 7·34 per cent. of tannic acid, and 13·9 per cent. of extract. Height of tree, 30 feet; diameter, 1 foot; stripped in May, analysed in July. Locally, it is a very common species.

The bark analysed had an average thickness of ⅜ inch; the interior consists largely of yellowish fibre, while the exterior is greyish, deeply furrowed, and consists of large flakes, useless for tanning purposes. It however, cuts solid, and its general appearance would lead one to suppose that it is richer than it is.

Northern N.S.W. and Central and Northern Q.

A rather large tree, with a durable timber. Brunswick River, J.H.M., J.L.B. Chincoggin Mountain, 30-60 feet high, 9-18 inches diameter, W.B. Woodburn, Richmond River, W.B.

4. A. Baeuerleni, Maiden and Baker. (*Proc. Linn. Soc., N.S.W.*, 1895, p. 583, with fig.).

A shrubby pubescent plant of about 3 to 7 feet as seen, generally 3-5 feet, throwing out numerous switch-like branchless stems from the ground. Confined to the Richmond and Clarence Rivers, so far as is at present known. New Italy, W.B.; Maclean, J.V.deC.

113. A. Baileyana, F.v.M., Ic. Austr. Ac.

"COOTAMUNDRA WATTLE."

Confined to N.S.W., in the district of Cootamundra, Bethungra, &c. A small tree, glaucous, and very beautiful, hence largely cultivated for ornamental purposes.

Mr. C. W. Darley informed me that near Bethungra he saw a magnificent specimen of this tree. The diameter of the trunk was 22 inches, and the foliage had been nibbled off horizontally, so as to give the tree the general appearance of a gigantic mushroom. This flat portion of the "mushroom" (or greatest spread of the leaves) was no less than 35 feet in diameter. It was the admiration of the district, but some vandal killed it for the sake of a few pounds of bark.

Found also on Big Mimosa run, Wagga district, also parish of Inglebah, county Bourke (Temora), and near Barmedman.

90. A. Bakeri, Maiden. *Proc. Linn. Soc., N.S.W.*, 1895, p. 337, t. xxi.

A large forest tree of Northern N.S.W. and Southern Q. It is one of the largest of the Acacias. It is closely related to *A. binervata* (it has three veins and more), and its bark is reputed to be poor in tannin. Murwillumbah, R.A.C.; Mullumbimby, W.B.

19. A. Baueri, Benth., Ic. Austr. Ac.

A pigmy species, collected near Rose Bay in 1886 by E. Betche, has been recently discovered by Mr. W. Forsyth in a second Sydney locality, the Centennial Park, also La Perouse, J.H.C. It was originally described from specimens obtained from North Australia, and very few localities (including Richmond River and Hunter River) are recorded between the North Coast of Australia and Port Jackson.

61. A. brachybotrya, Benth.

A "BLUE BUSH."

Two samples of this bark from the variety *argyrophylla* were forwarded to the Technological Museum by Mr. A. L. Thrupp, Balhannah, S.A., with the intimation that it is used in the adulteration of golden wattle bark (*Acacia pycnantha*) in South Australia.

The bark had been chopped, and from its general appearance it certainly would be somewhat difficult to detect when mixed with some samples of *Acacia pycnantha* bark. With the better samples of *Acacia pycnantha* the detection of admixture should not be difficult.

The barks are thin, inclined to be scaly, are somewhat fibrous, and of a reddish colour. They were stripped and analysed August, 1890, one with the result of 21·1 per cent. tannic acid, and 47·3 per cent. extract; the other gave 18 per cent. tannic acid, and 46·15 per cent. extract.

The first specimen came from Hammond, S.A., the exact locality of the other is unknown.

A dry-country species, found in the interior of N.S.W., V., and S.A. Said to be a pest on the Lachlan, N.S.W.

Lower Murray (C.F., jr.). Shrub 4-5 feet high, Roto and Coan Downs Stations, Lachlan district, J.D. This seems to be the true *brachybotrya* with the raceme reduced to a single head, a peculiarity of this species. Nyngan, in sandy soil. "Edible for stock." Nyngan, E.F.R.; Mudgee, N.T.

Var. *glaucophylla*, Benth. Glaucous and more or less pubescent. Phyllodia mostly ½ to ¾ in. long. Flower-heads mostly 2 to 5, shortly racemose, with about twenty to thirty flowers.—*A. brachybotrya*, Benth., as above; *A. dictyocarpa*, Benth. in Linnæa, xxvi, 616.—N.S.W. and V. (B.Fl. ii, 374).

Darling River (? Beckler); South Nymagee, about 2 feet high, eaten by sheep, R.H.C.

Var. *glabra*, Benth. Quite glabrous, phyllodia small and narrow; flower-heads small (B.Fl. ii, 374). Murray desert (B.Fl.). Not in Nat. Herb., Syd.

20. A. brunioides, A. Cunn.

Pretty little heath-like species of 2 or 3 feet. Wallangarra, E.B. and J.L.B. Also in Q.

100. A. Burkittii, F.v.M.

A good deal like *A. cyperophylla*, and sometimes confused with it, but flowers are tetramerous.

"Bastard Nilyah," White Cliffs, E.P.O'R. Small tree about 8 feet. Wood hard, and possesses a pleasant smell. Stock will not eat its leaves. K.H.B., Ivanhoe; Tarella, W.B.; "Needle-bush," 20 miles south of Bourke, known as "Kangaroo bush" and "Cherrypickera" in the Nymagee district, R.H.C. (See *Proc. Linn. Soc., N.S.W.*, 1901, p. 322).

A. linifolia, Willd.
A. prominens, A. Cunn.
A. crassiuscula, Benth. non Wendl.
A. decora, Reichb.
A. neglecta, Maiden and Baker.
A. buxifolia, A. Cunn.
A. lunata, Sieb.

The above species run into each other in such a way that no natural lines can be drawn between them, but as it is not advisable to include so many different forms under one name, some artificial lines must be drawn. Bentham lays much stress on the characters of the pod (seeds in the centre of the pod: *A. linifolia*, *prominens* and *crassiuscula*) and seeds near the upper suture of the pod: *A. decora*, *buxifolia* and *lunata*, but this character does not seem to be borne out by facts; I find it quite impossible to find a difference in the pods. The number of flowers in the heads, and the proportionate length of the inflorescence and phyllodia, the glands on the phyllodia, are all unreliable and variable characters; the structure of the flowers and the arillus of the seeds are alike or nearly alike in all the species. Mueller reduces them in the Census to the following species:—

A. linifolia, including *A. prominens*.

A. buxifolia, including *A. decora*.

A. lunata, including *A. crassiuscula*.

I have utterly failed to distinguish between *A. buxifolia* and *A. lunata*, but I do *not* propose a change in the nomenclature. I am not quite clear in the matter; we have not yet sufficient specimens with reliably matched flowers and fruits, and it would only increase the confusion if changes were to be made in a matter not fully cleared up.

I propose the following classification :—

A. linifolia, Willd.
· var. *prominens*, F.v.M. impl. (*A. prominens*, A. Cunn.)
A. buxifolia, A. Cunn.
var. *decora*,* F.v.M. impl. (*A. decora*, Reichb.)
var. *neglecta*, Maiden and Betche (*A. neglecta*, Maiden and Baker).
A. lunata, Sieb.
var. *crassiuscula*, Maiden and Betche (*A. crassiuscula*, Benth. non. Wendl.).

A. neglecta seems only a broad-leaved form of *A. buxifolia*; it has been chiefly distinguished from *A. buxifolia* on account of the pods, the seeds of which are in the centre of the pod and not close to the upper suture, as described by Bentham, but, as stated before, this is a character which I am quite unable to find. We have co-type specimens of *A. buxifolia* in the Herb., seen by Bentham, in which the pods are quite indistinguishable from those of *A. linifolia*.

59. A. buxifolia, A. Cunn., Hook. Ic. Pl. t. 164.

" Blue Bush," height 5 feet, spreading habit and considered almost as great a pest as Black Wattle† in the Lachlan and Riverina districts. F.R.T., Wagga Wagga ; Grenfell, W.S.C. ; Gulgong, J.H.M. ; Kelgoola near Rylstone, R.T.B. ; New England, C.S. ; Berrima, J.H.M. ; Bowral to Bullio, J.H.M. and R.H.C.

Var. *decora*, F.v.M. (*A. decora*, Reichb.).

N.S.W. and Q. E. Palmer says the gum is eaten by Palmer River, Q., aborigines.

The " Golden or Grey Wattle,"—" Baringa " of the aborigines of the Lachlan may be this species according to specimens sent by Forester T. Kidston. Wagga Wagga, J.H.M., R.H. ; Grenfell, W.S.C. ; Nymagee, J.W.C. ; " Western Silver Wattle," Cobar, R.H.C., J.L.B. ; Mt. Boppy, T.McN. ; Warrumbungles, W.F. ; Coolabah, R.W.P. ; Gilgandra, Mt. McDonald, R.H.C. ; Dubbo to Tomingley, Harvey Range, J.H.M., J.L.B. ; Parkes, J.H.M. ; Condobolin-Euabalong, J.H.M. ; Cullenbone, Mudgee, J.D.C. ; Clarence Siding, Mt. Victoria, Jenolan Caves, J.H.M. ; New England, C.S. ; Warialda, H.M.R.R. ; Howell and Inverell, J.H.M. and J.L.B.

The following note from Allan Cunningham's MS. Journal, under date 23rd August, 1817, probably refers to this variety :—

" *Acacia isoclania*. With lanceolate, oblique leaves, with three glands at equal distances on its interior margin ; flowers axillary and panicled. Near Bathurst, on W."

Var. *neglecta*, Maiden and Betche. (*A. neglecta*, Maiden and Baker, figured and described in *Proc. Linn. Soc. N.S.W.*, 1894, p. 163, t. xiii.)

A glabrous, rarely glaucous shrub, attaining a height of 12 feet or more, from the Bowenfels and Rylstone districts. In the Nat. Herb., Syd., there are specimens from Taloobie, Camboon, and Rylstone, collected by R. T. Baker.

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* Bentham (B.Fl. ii, 372) first suggested that *A. decora* might be a var. of *A. buxifolia*.

† *A. hakeoides*, A. Cunn.

17. A. calamifolia, Sweet, *Bot. Reg.*, t. 839; Ic. Sel. Thenen., i, t. 7; Lodd. *Bot. Cab.*, t. 909.

" WILLOW " or " BROOM WATTLE."—" Wallowa " of the aborigines of Lake Hindmarsh Station (Victoria). Compare *A. subulata*, p. 93.

A sample of bark was received in the year 1883 at the Technological Museum. I analysed this bark April, 1890, which came from the Murray Flat Ranges, S.A., and found it to contain 36·06 per cent. of tannic acid, yielding no less than 63·1 per cent. of extract. It is nearly $\frac{5}{16}$ of an inch thick, solid, smooth, containing very little fibre, and hardly to be distinguished from *A. pycnantha* bark.

So far as I know, *A. calamifolia* does not attain a size sufficient to yield bark similar to that under examination, and I trust that correspondents will kindly enable me to state the proper position of *A. calamifolia* as a bark-yielding wattle.

A. calamifolia is recorded from S.A., V., and the drier parts of N.S.W.

A small tree of 10 feet, with long, weak, needle-like leaves.

Lachlan, J.D.; Shuttleton, W.B.; Nymagee and Gilgunnia, R.H.C.; Liverpool Plains, C.M.; Merriwa, J.H.M. and J.L.B.

75. A. Cambagei, R. T. Baker. *Proc. Linn. Soc., N.S.W.*, 1900, p. 661, with t. xlii.

The " Gidgee," or " Stinking Wattle," well known for the evil-smelling odour of its foliage, particularly on the approach of rain. It is a dry-country species, yields a durable timber, poor feed for stock, while its bark contains but little tannin.

Found in N.S.W. and Q. Brewarrina, J.L.B.; Pera Bore, Bourke, R.H.C.

119. A. cardiophylla, A. Cunn.

A shrub with minute leaflets.

Dubbo and Minore, J.L.B.; Lachlan district, J.D.; 4-5 feet high, Sedimentary ridge, 8½ miles east of Wyalong, R.H.C.

108. A. cibaria, F.v.M.

A small tree, native of the dry parts of W.A., S.A., and N.S.W.

The seeds are used by the aborigines for food, while the leaves yield a valuable fodder.

It resembles the Narrow-leaved Mulga (*A. aneura*) a good deal, but the ripe pod is nearly terete, and not very flat, as in the case of the Mulga.

Ivanhoe, *via* Hay, K.H.B.; Cobar, J.L.B.; " Mulga," Broken Hill, A.C.L.; Grey Range, tree of 20-30 feet, W.B.

7. A. colletioides, A. Cunn., Ic. Austr. Ac.

" WAIT-A-WHILE " (an allusion to the predicament of a traveller desirous of penetrating a belt of it).

Some bark from a very old shrub was examined by the author, and yielded 4·4 per cent. of tannic acid, and 10·56 per cent. of extract. (*Proc. R.S., N.S.W.*, 1887, p. 87.) It consisted of little more than fibre. This is a dry-country wattle, and the most favourable specimen of it is not likely to be of use to the tanner, since, apart from its small percentage of tannic acid, it is but a shrub.

N.S.W., V., S.A., and W.A. In the two first States, at any rate, it is not found in the coast districts.

A dense shrub of 7-8 feet, suggested as a hedge. Has roundish pungent leaves of an inch or two.

Cobar, J.L.B.; Coolabah, R.H.C.; Nyngan, E.F.R., J.L.B.; Eremeran, "Narka" of the aborigines of the Lachlan, T.K.; Ivanhoe, *via* Hay, K.H.B.

88. A. complanata, A. Cunn., Hook. Ic. Plant., t. 167, as *A. anceps*; Banks and Sol. Illustr. i, t. 85.

Dr. T. L. Bancroft has been kind enough to send me some bark of this species from Enoggera, near Brisbane. It yielded 10·28 per cent. of tannic acid, and 31·1 per cent. of extract. It was from a tree 20 feet in height and 6 inches in diameter. Stripped in May, and analysed in July. It is exceedingly thin (under ⅛ inch when dry), smooth externally, very fibrous, and apparently of no promise as a tan-bark.

This species is confined to northern N.S.W. and Q.

The Bluff, Orara River, also on the Orara River near Bawden's Bridge, on Grafton-Glen Innes Road, and further on; Chatsworth to Woodburn, Richmond River (all J.H.M. and J.L.B.)

In N.S.W. it is a shrub or small tree; it attains a larger size in Q.

21. A. conferta, A. Cunn., Ic. Austr. Ac.

A shrub found in western N.S.W. and Q. Has sweet-scented flowers.

Minore and Dubbo, J.L.B.; Lachlan, J.D.

1. A. continua, Benth., Ic. Austr. Ac.

A prickly shrub, found in the drier parts of S.A., V., and N.S.W.

It is recorded as a native of N.S.W., on Mueller's authority (2nd Census), but I have no specimen in the Nat. Herb., Syd.

78. A. coriacea, DC., Ic. Austr. Ac.

A tree of 15-30 feet, confined, as far as N.S.W. is concerned, to the extreme north-west, *e.g.*, on the Grey Ranges (W.B.)

64. A. cultriformis, A. Cunn.; Hook., Ic. Pl., t. 170; Paxt Mag., xi, 113.

An ornamental shrub or small tree, often seen in gardens. Found in the States of S.A., Q., and N.S.W. (mostly in the drier parts).

Wyalong, 6 feet, R.H.C.; Dubbo, J.H.M.; 5 or 6 feet, Gilgandra, R.H.C.; Warrumbungle Ranges, W.F.; Denman, J.H.M., J.L.B.; Mount Dangar, near Merriwa, 8-12 feet, with an umbrella-like growth, stems 3-6 inches, J.L.B.; Mangula, New England, 15-20 feet, C.S.

103. A. Cunninghamii, Hook., Ic. Pl., t. 165; Banks and Sol. i, t. 87.

"BLACK WATTLE," "BASTARD MYALL" of Northern New South Wales. "Kurrieabah," or "Motherumbah." (See *A. Gnidium*). "Kowarkul" of the Queensland aborigines.

A specimen of this bark received from Dr. T. L. Bancroft, of Brisbane, and obtained from Deception Bay, gave 12·32 per cent. of tannic acid, and 26·95 per cent. of extract. It is known locally as "Black Wattle." It is from a tree 30 feet in height and 1 foot in diameter, stripped in May, analysed in July. Dr. Bancroft says: "This is the only tanning wattle which grows near Brisbane in any great abundance."

The inner bark consists largely of fibre, while the outer is furrowed and scaly, of a dark-brown colour; the thickness of the bark analysed averaged ½ inch under the outer scaly portion. The colour is dark-reddish brown, and altogether it looks a poor tan-bark. As a rule this tree carries a heavyish bark.

Following is an analysis of another Queenland sample of this bark :— Tannin, 9·13 per cent. ; extract, 16·15 per cent. (*Queensland Comm., Col. and Indian Exh.*, 1886.)

Central N.S.W. to Central Q.

Used for bullock-feed during the drought. The green pods contain saponin.

Woodburn, W.B. ; Evans River, 30-40 feet, W.B. ; Lawrence to Casino, W.F., W.B. ; Hastings River, G.R.B. ; 6-10 feet, Warialda, J.L.B. ; " Kurracabah," or " Motherumba," Narrabri, J.H.M. ; " Lady's Finger Wattle " (in allusion to the specially fine spikes of flower) ; " Lignum vitæ," 10-20 feet high, 6-8 inches diameter ; leaves pendulous. Near foot-hills, Mount Dangar, Gungal, J.L.B. ; Warrumbungles, W.F. ; Quirindi, W.McD. ; Mudgee district, W.S.C. ; Goulburn River, R.T.B. ; Denman, A.R. ; Page River, " the bullocks are leaving the kurrajong and eating these twigs in preference " (W.T.S., Aug. 1902, height of drought).

Var. *longispicata*, Benth. Branches stout and still more angular. Phyllodia 6-8 inches long, 1-2 inches broad. (B.Fl. ii, 407.)

Specimens from Mount Dangar, Murrumbo, the Upper Hunter, and some of those from the Evans River, are all coarser and more angular than the type, but the spikes are barely even 3 inches long.

101. A. cyperophylla, F.v.M. ; Ic. Austr. Ac.

A slender broom-like wattle. A tall shrub or small tree. A dry-country species. Found in S.A., N.S.W., and Q.

Broken Hill, A.C.L. ; " Pin-bush," Bourke district, A.W.M. ; Coolabah, R.H. ; a " Sifting-bush," E.F.R., Nyngan ; Lachlan, " Weeder " of the aborigines (Kidston).

72. A. Dawsoni, R. T. Baker, *Proc. Linn. Soc., N.S.W.*, 1897, 153, with a figure.

A dense virgate shrub, rarely exceeding 5 feet in height, from the Rylstone district.

43. A. difformis, R. T. Baker, *Proc. Linn. Soc., N.S.W.*, 1897, p. 154, with a figure.

A small glabrous, shrubby tree of 20-30 feet, found in the drier parts of N.S.W., *e.g.*, Tocumwal, Cobar, Merrygoen (Collector ?), Bylong (R.T.B.). Reminds the describer of the " narrow-leaved " form of *A. penninervis*, but the pod is very different. It yields a gum arabic.

12. A. diffusa, Lindl. ; *Bot. Reg.*, t. 634 ; *Bot. Mag.*, t. 2,417 ; Lodd. *Bot. Cab.*, t. 631 (as *A. prostrata*).

Called " Prickly Wattle " in Tasmania, and " Pin-bush " in N.S.W. A prickly species, common also in V. Allied to *A. juniperina*, a small shrub.

Grenfell, J.H.P. ; Queanbeyan, E.B. ; Yass, J.M.C. ; Goulburn, J.H.M. ; Barber's Creek, J.H.R. ; Perth, near Bathurst, J.L.B. ; Cadia and Lewis Ponds, R.H.C.

Var. *cuspidata*, Benth. Phyllodia more slender, often not broader than thick, sometimes all under ¾ inch, sometimes on barren shoots attaining 2 inches. It seems to me difficult to maintain this as a distinct variety.

117. A. discolor, Willd., Andr. *Bot Rep.* t. 235, as Mimosa ; Banks et Sol. Illustr. i, t. 90 ; *Bot. Mag.*, t. 1750 ; Lodd. *Bot. Cab.*, t. 601 ; Vent. *Hort. Cels.*, t. 1, as *Mimosa botryocephala.*

A straggling medium-sized shrub, common in T., V., and the cooler parts of N.S.W., and in the Sydney district. The " Flora Australiensis " says that it is found as far north as the Macleay River, but it is so common that it is seldom collected for herbaria.

Bolaro Track, Braidwood, W.B.; Conjola, W.H.; Barber's Creek and Wingello, H.J.R. and J.H.M.; Berrima, J.H.M.; Clarence Siding, Blue Mts., J.H.M.

105. A. doratoxylon, A. Cunn., Ic. Austr. Ac.

" Currawang," and formerly " Spear Wood," since it was one of the trees used by the blacks for that purpose.

Usually it grows in single, small, straight stems as a scrub, on stony hills, but on low ground it attains the dignity of a tree. Miss M. A. Clements, of Condobolin, measured one 3 feet in circumference. It yields a second-rate fodder. Found in the drier parts of most of the States. Closely allied to the well known Raspberry Jam tree of W.A. (*A. acuminata*, Benth.).

" Upright tree 20-30 feet; diameter 12-18 inches. Found chiefly on dry stony ridges on Bedooba and other stations. Common in Lachlan district," J.D. " Small slender tree, 15-20 feet, only found on stony hills. Wood remarkably hard, and smells sweet when fresh. Much used by blacks for manufacture of weapons. Stock will *not* eat the leaves." Ivanhoe, *via* Hay, K.H.B.; Wagga Wagga, J.H.M.; Wyalong, A.O.; Wooyeo, Lake Cudgellico, G.S.H.; Euabalong, R.H.C.; Bumberry near Molong, J.H.M.; Dubbo to Tomingley, J.H.M.; very narrow-leaved form, Harvey Range, J.L.B.; Coolabah, J.L.B.; Nyngan," edible for stock—on porphyry ridges," E.F.R.; " Bastard Yarran," Mount Boppy, J.McN. Large pendulous, ugly shaped trees, scantily distributed on the ridges, Gungal near Merriwa, J.L.B.; Wybong Creek, Denman, A.R.; Bylong Creek, R.T.B.

Var. *ovata* (Maiden and Betche, *Proc. Linn. Soc. N.S.W.*, 1905, p. 362), var. nov.

Stanthorpe, Southern Q., J.L.B.; Howell, N.S.W., J.H.M. and J.L.B.

A low spreading shrub not exceeding 2 feet in height, with densely intricate branches. Flowers in short ovate heads, often almost globular, rarely in short but distinctly cylindrical spikes. Seeds shorter than in the typical *A. doratoxylon*, and with a more compact arillus. All other characters are those of the type.

This well-marked variety seems to be confined to the granite rocks capping the tops of many hills in the northern New England district. It grows in dense masses along the fissures of the rocks, forming in many places almost the only vegetation of the bare rocks.

50. A. Dorothea, Maiden, *Proc. Linn. Soc. N.S.W.*, Aug. 1901, vol. xxvi, part i, t. 1.

A graceful silvery-leaved small shrub of several feet, allied to *A. rubida*. It is confined to the Blue Mountains and spurs, so far as is known at present, being very abundant at Leura, and extending to Clarence Siding, Mount Wilson, and the Jenolan Caves.

71. A. elongata, Sieb.; *Bot. Mag.*, t. 3337.

A slender shrub, very showy with its profusion of bright yellow flowers.

Conjola, W.H.; Jervis Bay, J.H.M.; Barber's Creek, J.H.M. and H.J.R.; Appin, J.H.M.; Helensburgh, W.F.; National Park (leaves

dilated at the apex and mucronate), M.B.; Port Macquarie, J.H.M.; Ballina, W.W.W. and W.B.; Woodburn, W.B.; Evans River, W.B.

The North and Sydney forms are often very narrow, *e.g.*, Manly, J.H.M.; Woodford, Lower Hunter, J.G.; West Maitland, W.H.Y.; New Italy, W.B.

Var. *angustifolia*, Maiden and Betche.

We propose this name for the plant referred to at p. 58 (foot-note). It is a slender species, up to 4 or 5 feet high, apparently always found in swamps, and with very narrow, somewhat pungent phyllodes. Flowers pale yellow or cream coloured and not to be confused with the northern narrow-leaved form of *A. elongata* just referred to. The present form is certainly allied to *A. trinervata*.

It is common in the Blue Mountains.

It seems to me to be Allan Cunningham's "*Acacia rigens* of the Blue Mountain marshes," referred to at p. 124 of his MS. Journal.

87. A. excelsa, Benth., see *Proc. Linn. Soc.*, May, 1901, vol. xxv, part 4, t. 40 (photograph of tree).

"IRONWOOD," sometimes (though erroneously) called "Brigalow." Called "Bunkerman" by the aborigines of the Cloncurry River, North Q.

A Queensland correspondent informs me that a sample of this bark, analysed in London, yielded 16·09 per cent. of tannic acid.

From Dubbo to the western boundary of N.S.W. Found also in Q. Attains a height of from 30 to 50 feet. It is a prominent object, as it has rather a dense head. It has a hard timber as its name denotes. Leaves are stated to be ½-¾ inch (B. Fl.), but we have specimens in the Herbarium of much greater length.

Tarcoon, J.L.B.; Bourke district, R.H.C.; Drysdale, near Cobar, R.H.C.; Coolabah, R.H., J.H.M., J.L.B.; Warialda, "eaten by stock," W.McD.; narrow-leaved form, Nymagee, R.H.C.

41. A. falcata, Willd.; Wendl. Comm. Ac. t. 14; Lodd. Bot. Cab., t. 1115.

A tall, slender, unornamental shrub, useless for any purpose so far as I know. Found in N.S.W. and Q.; common about Sydney; extends south to the Shoalhaven River, and north to New England. It has been confused (on herbarium specimens only) with a more important species than itself, *e.g.*, *A. implexa*.

81. A. farinosa, Lindl.; Ic. Austr. Ac.

Found in the drier parts of S.A., V., and W.A., and recorded from N.S.W. on Mueller's authority, but not in Nat. Herb. Syd. from N.S.W.

122. A. farnesiana, Willd.; Wight Ic., t. 300, as Vachellia.

Sometimes called by the absurd name of "Dead Finish." This name, given to some species of *Acacia* and *Albizzia*, is on account of the trees or shrubs shooting thickly from the bottom, and forming an impenetrable barrier to the traveller, who is thus brought to a "dead finish" (stop).

The name "Bunkerman," would appear to be given to this species on the Cloncurry River, N.Q., as well as to *A. excelsa* (E. Palmer), a very different tree.

This species is common in the tropics of both worlds. Wood close, heavy, and tough, taking a good polish. It is much used in India for ship-knees, tent-pegs, and similar purposes. Gamble (*Manual of Indian Timbers*) gives its weight as 49 lb. per cubic foot.

The flowers yield a delightful perfume, and for that quality are much cultivated in the south of France. The cultivation of this plant is particularly worthy the attention of settlers in Australia as an auxiliary industry. In Italy and France its sweet-scented flowers are mixed with melted fat or olive oil, which becomes impregnated with their odour, and constitutes the fine pomade called "Cassie." The odour is less marked in the Australian plant.

The pithy substance in which the seeds lie is eaten by the natives roasted. (Palmer).

Interior of all the States except T. and V.

Our Australian form is a much smaller plant than the Indian one.

"A small shrub with interwoven branches," Moree, J.L.B.; "a scrambling round shrub of 3 feet high, and the spread of branches is 6 feet; prostrate," Narrabri, J.H.M.; "Scrambling shrub of 4 or 5 feet on the banks of the Bogan, near Coolabah, J.H.M., J.L.B.

40. A. fasciculifera, F.v.M., occurs on the Severn (Hartmann). Fruit of *A. macradenia* described in the Flora Australiensis belongs to *A. fasciculifera* (Mueller in *Proc. Linn. Soc., N.S.W.*, 1890).

The Severn is near the N.S.W.–Q. border, and Mueller has recorded the species to both States. We have no N.S.W. specimen in the Nat. Herb. Syd., so far. It is, of course, commoner in coastal Q.

91. A. flavescens, A. Cunn.

This bark containes 10·2 per cent. of tannin (Staiger).

Has very large falcate phyllodes with usually three or four strongly marked veins. Found in N.S.W. and Q. On the Tweed it is a small tree. (I have lost my N.S.W. specimens, and therefore wish to enumerate this as a doubtful N.S.W. species for the present.)

82. A. flexifolia, A. Cunn.

A shrubby species confined to N.S.W. so far as is at present known. "Shrub 2 or 3 feet, Mimosa and other stations in Lachlan District," J.D.; Gundagai, J.M.C.; Dubbo, J.L.B.

The following description, taken from Cunningham's MS. Journal, under date 6th August, 1817, refers to this plant.

"*Acacia curvifolia*, A. Cunn. MSS.

"Around our tent I discovered a new Acacia with linear-lanceolate leaves which are bent by the indenture of a gland on the interior margin, solitary, axillary capitula of flowers and elongated filaments. A very ornamental shrub, Lachlan district."

47. A. gladiiformis, A. Cunn. Figured by R. T. Baker in *Proc. Linn. Soc., N.S.W.*, 1897, t. xxii.

A tall shrub, confined to N.S.W. "Blue Mountains and rocky hills to the westward" (B.Fl. ii, 366).

Dubbo, J.L.B.; "Leaves curve upwards, with glands 2 to 5 on upper edge," Gilgandra, R.H.C.; Rylstone, R.T.B.

106. A. glaucescens, Willd.; Spec. Pl. Hort. Berol., t. 101; Maiden and Campb., Flowering Pl. and Ferns, No. 4; Bot. Mag., t. 3174, as *A. cinerascens*; Wendl. Comm. Ac., t. 13, as *A. homomalla*.

A "MYALL" and "BOREE" of Southern N.S.W. Called also "BRIGALOW," "ROSEWOOD," &c.

Bark from near Bombala, N.S.W., yielded 8.10 per cent. of tannic acid, and 14·29 per cent. of extract. (*Proc., R.S., N.S.W.*, 1887, p. 91.) It

was locally termed "Myall," and was grown on limestone. Height, 20-25 feet; diameter, 6-12 inches. A deeply-fissured bark, of a dark-grey colour.

From V. to Q., a favourite situation being high river banks amongst rocks.

A handsome species, particularly when in full flower. *A. Maideni* has been confused with it.

Belowra, Tuross River, J.S.A., most southern locality recorded; "Silver Wattle," Shoalhaven River, A.M., W.F., and A.A.H.; Barber's Creek, H.J.R.; Picton to Bargo, Thirlmere, J.H.M.; Nepean River, J.H.M., E.B.; Port Stephens and Nelson's Bay, A.R.; Port Macquarie, G.R.B.

38. A. Gnidium, Benth., var. *latifolia*, Maiden and Betche, *Proc. Linn. Soc., N.S.W.*, xxx, 362 (1905); a photo. by Mr. Cambage in same vol., p. 215.

This is a tall viscid shrub, found near Gilgandra, and known as "Mother-umbung," R.H.C. (Cf. *A. salicina* and *A. Cunninghamii*, called "Mother-umbah," perhaps a similar name). Near Dubbo, J.L.B.

The species is a rare one, and further information is desired concerning it.

52. A. hakeoides, A. Cunn.; Ic. Austr. Ac.

A tall shrub or small tree found in the drier parts of V., N.S.W., and Q. It often grows in clumps like mallee. It commonly bears the name of "Black Wattle," Pukarlika," of Boulia, Q. blacks (Roth).

"Silver Wattle," Tocumwal, S.P.; "Black Wattle," Wagga Wagga, J.H.M.; Lachlan and Murrumbidgee, J.D., "Black Wattle. An upright shrub or small tree of 5-10 feet. Produces suckers from roots, especially when cut. Common all over Lachlan district, also in Murrumbidgee district." Wyalong, "Black Wattle," A.O.; Bogan Gate to Condobolin and Euabalong, J.H.M.; Tomingley to Peak Hill and Narromine, J.H.M.; Dubbo, J.L.B., "Black Wattle"; Gilgandra, R.H.C.; Girilambone, J.L.B.; Coolabah, R.W.P.; Cobar and Mount Boppy, J.L.B.; Bathurst, C.M.; Gulgong (Barnard), Talooby, R.T.B.; Warrah, J.G.

86. A. harpophylla, F.v.M., Ic. Austr. Ac.

The common "BRIGALOW"; so called because it forms the scrubs of that name; the meaning of the word is unknown.

This tree yields a considerable amount of tan-bark of inferior quality. A Queensland correspondent informs me that a sample analysed in London gave 11·59 per cent. of tannic acid.

For a popular account of this too-plentiful Queensland wattle, see a paper by the late Rev. J. E. Tenison-Woods, in *Proc. Linn. Soc. N.S.W.*, vii, 570.

Central Q. and N.S.W.

It attains a height of 20-30 feet. Someone has called it the "national scrub" of Queensland, so abundant is it. In the Narrabri district it is very abundant, and it extends more or less abundantly as far as the Darling and beyond. It extends as far south as Coolabah and Marsden.

Tarcoon, J.L.B.; Bourke district, A.W.M.; Coolabah, J.L.B.; Nyngan, E.F.R.; Dubbo, A.R.S.; Marsden, R.H.C., most southern locality recorded; plains near Baradine, W.F.; Warrah, Willow-tree, J.G., pods described by Maiden and Betche, *Proc. Linn. Soc. N.S.W.*, 1899; Scone, R.H.C., J.H.M.; Moree, W.S.C.; Warialda, H.M.R.R.

80. A. hispidula, Willd.; Hook., Ic. Pl., t. 161; Lodd. Bot. Cab., t. 823; Sm. Bot. Nov. Holl., t. 16, as Mimosa.

A small rough-leaved species rather common in some parts of Port Jackson. Received also from 8-mile Plain, near Brisbane.

74. A. homalophylla, A. Cunn.; Ic. Austr. Ac.

"YARRAN."

A specimen of this bark gave the following result:—Tannic acid, 9·06 per cent., and extract, 21·51 per cent. (*Proc. R.S., N.S.W.*, 1887, p. 189.)

It was from an old tree, full of flakes, and could be pulled to pieces with the fingers. A dry-country bark, but hardly a fair specimen of that. Found in the interior of S.A., V., N.S.W., and Q.

One of the best firewoods of the west. Timber hard, and of a violet odour. Blacks used to eat the seeds. It yields an adhesive gum. Cattle are fond of the leaves.

Wanganella, near Hay, E.O.; Ivanhoe, *via* Hay, K.H.B.; Wyalong (Forester Osborne); "a spreading tree 20-25 feet, stems 6-12 inches diameter, plentiful all over Lachlan district," J.D.; Darling to Warrego, E.B.; Dunlop, Louth, R.E.; Bourke, A.W.M.; Coolabah, R.H.; Nyngan, E.F.R.; Tomingley to Peak Hill, J.H.M.; Minore, J.L.B.; Belltrees, Scone, H.L.W.; Warialda, H.M.R.R.

"Narran is an edible scrub somewhat resembling brigalow; but is more desirable as fodder. It grows mostly in the interior and far west of N.S.W., and in one small patch in the north of Q. It had been known for some time that narran grew somewhere up north, as blacks had been found with spears made of it; but it had not been seen by the whites. In 1881, when taking cattle out to stock some new country in the Northern Territory, I came across a large belt of it on the very head of a branch of the Nicholson River, almost on the dividing watershed. From the appearance of the scrub it was a popular resort of the natives for the purpose of making their weapons, the whole belt having been picked over, and the ground was strewn with shavings and chips. Narran is not found in W.A."

The above paragraph occurs in the *Sydney Mail* for 1890. I have vainly tried to trace the name. Perhaps it is intended as a variant of Yarran. Perhaps it is another name for the Currawang (*A. doratoxylon*).

85. A. implexa, Benth.

"HICKORY." Sometimes called "BASTARD MYALL."

I have analysed a sample of this bark (*Proc. R.S., N.S.W.*, 1888, p. 270). It gave 7·82 per cent. of tannic acid and 20·54 per cent. of extract. It is slightly bitter to the taste, owing to the presence of a saponin, but this sample is from an old cultivated tree, and the bitterness is less noticeable; hoary-looking, in layers and flakes; average thickness, ¼ inch.

Bark of this species from Deception Bay has been sent to me by Dr. T. L. Bancroft, of Brisbane, and found to contain 14·16 per cent. of tannic acid and 33·51 per cent. of extract. It was from a tree 15 feet in height and 4 inches in diameter. It was stripped in May, and analysed in July.

V., N.S.W., and Q.; chiefly a coast species, and on eastern mountain slopes. Intermittently it extends a considerable distance westerly.

This is one of the barks used by the blacks for stupefying fish. Stock eat the leaves freely (A.M.).

A tree of medium size, say 30 feet, and very abundant.

Kogarah and Woniora River, J.H.C.; Lane Cove, W.F.; Stanwell Park, J.L.B.; all localities near Sydney; Jenolan Caves, W.F.B.; Portland, Mudgee line, J. Geddes; Weddin, J.H.M.; "Hickory," Nymagee, R.H.C. (most westerly locality recorded); Scone, J.H.M.; Lismore River, W.B.; Guyra-Tingha Road, R.H.C.; Tenterfield to Sandy Flat, J.H.M.; Acacia Creek, Macpherson Range, W.D.; Walcha, A.R.C.

83. A. ixiophylla, Benth.

A glabrous or pubescent glutinous shrub of several feet. Found in W.A., Q., and N.S.W.

Goulburn River, also Rylstone, R.T.B.; Warrumbungle Ranges, W.F.; Brigalow scrubs on the Severn (Leichhardt); Wirlong, Nymagee, R.H.C.

114. A. Jonesii, F.v.M. and Maiden, *Proc. Linn. Soc. N.S.W.*, 1893, p. 13, with figure.

A dwarf scrambling shrub, allied to *A. decurrens*. From the Goulburn district, *e.g.*

Box Point to Barber's Creek, J.H.M.; Barber's Creek, H.J.R.; Wingello, J.H.M. and J.L.B.; Kenmore, near Goulburn, J.H.M.

16. A. juncifolia, Benth.; Ic. Austr. Ac.

A slender shrub with narrow leaves (*A. pinifolia*, Benth., in Mitchell's *Trop. Austr.*, 342).

Found in N.A., Q., and N.S.W.

"Tooliah" of the aborigines of the Lachlan (Kidston).

Warialda ? (J.H.M. and J.L.B. Pods wanted to confirm).

I want N.S.W. specimens, as also of var. *planifolia*, Benth. "Phyllodia flatter, nearly a line broad, with a more prominent midrib, almost like those of *A. calamifolia*, but the penducles are simple."

10. A. juniperina, Willd.; Lodd. Bot. Cab., t. 398; Banks and Sol., Illustr., i, t. 82; Vent. Jard. Malm., t. 64, as Mimosa; Wendl. Coll., ii, t. 6, as *Mimosa ulicina*.

The common Prickly Wattle of the coastal and mountain districts. A prickly, scrambling shrub, usually with white or cream-coloured flowers. Found in T., V., Q., and N.S.W., and very common in N.S.W.

Var. *Brownei*, Benth.; Lodd. Bot. Cab., t. 1333, as *A. Brownei*.

Branches glabrous; peduncles slender. A slenderer plant usually with bright yellow flowers.

104. A. Kempeana, F.v.M., Ic. Austr. Ac.

A species allied to the Mulga, but with broader leaves. Found in the drier parts of all the mainland States except V.

Girilambone, R.W.P.; "Currawang Scrub, short leaf, mallee-like growth," E.F.R., Nyngan.

3. A. lanigera, A. Cunn.; Bot. Mag., t. 2,922. R. T. Baker in *Proc. Linn. Soc. N.S.W.*, Nov., 1895, vol. x, part 2, t. 27.

A rigid shrub of several feet, often woolly.

Found in S.A., V., N.S.W., and Q.

" Kangaroo Island (Tepper); it includes *A. venulosa* and *A. Whanii*. Bentham placed the fruit of *A. Oswaldi* with *A. lanigera*." Mueller in *Proc. Linn. Soc. N.S.W.*, 1890.

In New England and its slopes, *e.g.*, Howell, J.H.M., J.L.B.; Warialda, H.M.R.R. (quite glabrous); also Yass, J.M.C.

Var. *venulosa*, F.v.M. (*A. venulosa*, Benth.). A tall shrub, softly pubescent or glabrous, and sometimes slightly viscid. Common in New England, *e.g.*

Timbarra, C.S.; Boonoo Boonoo, J.L.B.; Tenterfield, E.B.; Tingha, R.H.C.; Warrumbungles, W.F.; Coonabarabran, S.L.; Rylstone, R.T.B.; Perth, near Bathurst, J.L.B.; Mullion Creek, Orange, R.H.C.; Bumberry, near Molong, J.H.M.; Wagga district, J.H.M.

36. A. leprosa, Sieb.; Bot. Reg., t. 1,441 (rather doubtful).

A small pendulous tree or tall shrub, from V. and extreme south of N.S.W.

It resembles *A. verniciflua* in phyllodes and aromatic exudation a good deal.

Delegate, W.B. (the Port Jackson locality given in B.Fl., ii, 358, appears to be doubtful).

Var. *tenuifolia*, Benth. " Branches erect. Phyllodia very narrow, linear-falcate, with recurved points." I expect to find this form in N.S.W. Have found it very close to the V.-N.S.W. border. This is a variety sometimes confused with *A. subporosa*, var. *linearis*. The head of flowers is, however, nearly ovoid in bud, with lanceolate bracts with ciliate margins. Glandular dots common, often blackish. Usually one vein (midrib). Buds less viscid. Phyllodes usually under 2 inches long, falcate, rarely if ever straight.

120. A. leptoclada, A. Cunn.

A tall, weak-growing shrub of 6-10 feet, of stooling habit, hirsute, one of the most beautiful of all Acacias.

N.S.W. and Q.

Warialda, Coolatai, Wallangra, H.M.R.R.; Howell, J.H.M., J.L.B.; Tingha " and towards Guyra," R.H.C.

The pods and seeds are hitherto unknown, and may be described as follows:—

Pods linear, generally more or less curved, rarely straight, 2 to 2½ inches long and about ⅓ of an inch broad, densely covered with somewhat reddish coarse hairs. Seeds thick, ovate, almost black, 6 to 9 to the pod, obliquely placed, the funicle about half as long as the seed, much thickened and dilated under the seed.

55. A. leptopetala, Benth.; Ic. Austr. Ac.

A small tree of 15-20 feet with a dense branching head, found at Nyngan, N.S.W. (W.B.).

Before Mr. Baeuerlen found it in N.S.W. it was recorded only from W.A. Extended examination of our far west will, I feel sure, bring to light many plants hitherto not recorded for N.S.W., but from W.A., S.A., or Q. (surely *A. leptopetala* will be found in S.A.). Local variation may be observed, especially with plants recorded from W.A. We have to do much botanical exploration in N.S.W. even yet, especially in the far west, and, to a less extent, in the north. I want correspondents in those districts to send twigs of the commonest wattles.

99. A. linearis, Sims; Bot. Mag., t. 2,156; Lodd. Bot. Cab., t. 595; Bot. Reg., t. 680, as *A. longissima*; Wendl. Comm. Ac., t. 11, as *A. longissima.*

A weak shrub or slender small tree, found in T., V., and N.S.W. It is common in the coastal districts of N.S.W. Southern localities are Termeil and Cockwhy Creek, J.H.M.; and northern, Uralla, Ballina, Richmond River, W.W.W. and W.B.; Byron Bay, J.H.M., J.L.B., and E.B.

It may be looked for in south coastal Q.

29. A. lineata, A. Cunn.; Engler, Nat. Pflanzenfam., iii, 3, p. 108, fig. 63.

A bushy shrub found in the drier parts of S.A., V., N.S.W., and Q. A very showy species when in flower. "Shrub of 3-5 feet," Mulwala, T.G.S.; "Blue bush," Wyalong, A.O.; Bygo Run, Wagga District, "4 feet, spreading habit, scarce," F.R.T.; Dubbo district, J.L.B.; Tomingley to Narromine, J.H.M.; Gilgandra, R.H.C.; Warrumbungle Range, W.F.

58. A. linifolia, Willd.; Bonpl. Jard. Malm., t. 16; Bot. Mag., t. 2,168; Lodd. Bot. Cab., t. 383 (doubtful); Andr. Bot. Rep., t. 394, as *Mimosa linifolia*; Vent. Jard. Cels., t. 2, as *Mimosa linifolia*; Wendl. Hort. Herrenh., t. 18, as *Mimosa linearis.*

A "SALLY."

Dr. T. L. Bancroft, of Brisbane, was kind enough to send me bark of this tree from Enoggera, near that city, and furnished the following note:—"In gullies this species grows to the height of 20 feet or more, but on dry ground is only a whip stick; the same remarks also apply to *A. complanata.* Both these species grow on the edge of the scrub, and there thrive well." Height 20 feet; diameter, 6 inches. [Memo.:—The tree never attains this size within the Sydney district.] Stripped in May; analysed in July; and found to contain 11·13 per cent. of tannic acid and 28·15 per cent. of extract.

The bark analysed was poor, thin, and flaky externally. It is inclined to be fibrous, the thickness is under ⅛ inch, and altogether it is not a promising bark.

Found in N.S.W. and Q., usually in the coast districts.

Common in Sydney district, also in Blue Mountains, *e.g.*, Springwood, Woodford, Leura; Woodford, Lower Hunter, J.G.

Var. *prominens*, F.v.M. (*A. prominens*, A. Cunn.; Bot. Mag., t. 3,502. R. T. Baker in *Proc. Linn. Soc.*, May, 1892, vol. vi, part 3, t. 37; Dietr. Fl. Univ. N. Ser., t. 83 ?).

This is called "Grey" and "Black Wattle" near Sydney, "Silver Wattle" and "Sally" near Gosford, but dealers will not have it, and it hardly pays to cut up and pass with better bark. A sample of a black bark, stained, leopard-like, with whity-green patches, and bearing lichens, yielded the writer 18·03 per cent. of tannic acid and 42·35 per cent. of extract. It was from Penrith, N.S.W.

A sample from Penshurst, Illawarra line, near Sydney, gave the author (*Proc. R.S., N.S.W.*, 1888, p. 269) 39·98 per cent. of extract and 14·42 of tannic acid. Height of tree, 10 to 15 feet; diameter, 1½ to 2 inches; collected September, 1887; analysed August, 1888. A light-coloured bark, very thin, of the thickness of stout brown paper, and reminding one strongly of that of *A. longifolia.*

A very promising-looking bark obtained from the same locality in February, and analysed the same month, gave 19·75 per cent. of tannic acid and 46·95 per cent. of extract. It is fairly thick, pale in colour, has little fibre, and its low percentage of tannic acid is certainly disappointing. I doubt whether a finer sample of this bark is obtainable ; if this surmise is correct, the value of this bark is fixed at under 20 per cent. of tannic acid.

A specimen from trees 15 to 20 feet high, and having a diameter of from 4 to 8 inches, was collected in February, 1890, at Krackenback Mountain, Jindabyne, N.S.W., and analysed January, 1891. It was found to contain 11 per cent. tannic acid and 29·75 per cent. extract. This bark is deceptive in appearance, being smooth, breaking short, with little fibre, and altogether a fair-looking bark.

Found in V., N.S.W., and Q. On the Snowy Mountains it occurs at elevations from 4,000 to 5,000 feet. It is an eastern form found principally in the coast districts.

This is a beautiful variety, presenting an infinite gradation of leaf (phyllode) form between the linear leaves of the type and the broadest forms that can be included under var. *prominens*. It is very widely diffused in N.S.W., and some localities represented in the Nat. Herb. Syd., are classified :—

Sydney district.—Kogarah, Hurstville, Oatley, Penshurst, Canterbury.
Western localities.—Sydney to the Blue Mountains.
Southern localities.—Jindabyne, J.H.M. and W.F. ; Badgery's Crossing to Nowra, W.W.F. and A.A.H. ; Bowral to Wollondilly River, J.H.M. and R.H.C.
Northern localities.—Gosford to Newcastle, used for axe-handles. I have a piece of timber from a tree 76 feet high! Woodford, Lower Hunter, J.G. ; Warrah, J.G. ; Page River, Scone, J.H.M. ; Unkya, Macleay River, G.R.B. ; Tia Falls, Walcha, W.F., E.C., and J.H.M. ; Tamworth, H.M.R.R. ; Emmaville, 6-8 feet, J.L.B. ; Boggabri, J.H.M. ; Bolivia, E.B. ; Jennings, J.H.M.

98. A. longifolia, Willd. ; Bot. Mag., t. 1,827 and 2,166 ; Maund's Botanist, t. 77 ; Bot. Reg., t. 362 ; Lodd. Bot. Cab., t. 678 ; Banks and Sol. Illustr. i, t. 86 ; Dict. Sc., Nat., 259 ; Paxt. Mag. 4, 197 and 12, 269 ; Brown, For. Fl., S.A., t. 28 ; Maiden and Campb. Fl. Pl. and Ferns, No. 9 ; Andr. Bot. Rep., t. 207, as Mimosa ; Vent. Jard. Malm., t. 62, as Mimosa.

"SYDNEY GOLDEN WATTLE," "White Sallow or Sally," "Hickory," &c.

The bark of this tree is considered in Q. to be only half as good as that of *A. decurrens*. It is used chiefly for sheepskins. The following is an analysis of this bark :—Tannin, 12·67 per cent. ; extract, 32·05 per cent. (Staiger.) A specimen from Cambewarra, N.S.W., yielded the author 18·93 per cent. of tannic acid and 30·55 per cent. of extract. (*Proc. R.S., N.S.W.*, 1877, p. 90.) Other specimens (*a*) from Oatley's Grant, near Sydney, and (*b*) Ryde, near Sydney, yielded the author (*loc. cit.*, p. 190), 15·34 and 15·99 per cent. of tannic acid respectively, and 24·91 and 23·53 per cent. of extract respectively. Both were from much younger trees than the specimens from Cambewarra.

Speaking generally, this is a smoothish, thin, sub-scaly bark, not in high repute. It yields a light-coloured powder.

ACACIA LONGIFOLIA.
SYDNEY GOLDEN WATTLE.

A sample from Tantawanglo Mountain, near Candelo, N.S.W., and locally known as " Hickory," was examined by me, and found to contain 5 per cent. of tannic acid, and only 14 per cent. of extract. It was collected in July, 1889, and analysed in April, 1890. It was from trees 20 to 50 feet high, with diameters of 4 to 12 inches, growing on chocolate soil. The trees of this species attain rather large dimensions in this district. The bark becomes coarser and larger, but it is one mass of fibre, and practically useless to the tanner.

S.A., T., V., N.S.W., Southern Q.

A. longifolia is very variable in appearance, and some of the forms seem worthy to be classed as distinct species (*e.g.*, var. *floribunda*), but there are numerous connecting forms, particularly in Tasmania.

The normal form is a slender shrub or small tree found in damp land or on the banks of water-courses, and has bright yellow flowers. It is found from north to south of the State and at least as far west as the Harvey Range.

Var. *floribunda*, Bot. Mag., t. 3,203, as *A. intermedia* ; Lodd. Bot. Cab., t. 763, as *A. angustifolia* ; Vent. Choix, t. 13 as *Mimosa floribunda*.

" The Sally."—A small tree, usually near water-courses. Thinner, smaller, more abundant phyllodes and flowers than the normal form. A beautiful plant, from end to end of the State, coast and coast mountain ranges. Bark obtained from Cambewarra in August, 1886, yielded the following result in April, 1890 :—Tannic acid, 6·09 per cent. ; extract, 14·95 per cent. It was from trees 20 to 50 feet high, locally known as " Sally," or " Sallow." The bark is very like that of the normal species, but from an older tree, and also full of fibre. A specimen of " Sally " from Bolong Swamp, Nowra, collected in July, 1888, and analysed also in April, 1890, gave only 2·54 per cent. of tannic acid, with 13·07 per cent. of extract. It is a useless, fibrous bark, yielding a substance like chopped grass when passed through the mill. It was from trees 20 to 40 feet high, with diameter of 6 to 18 inches, and grown on alluvial soil, which the species in general usually favours.

Var. *Sophoræ*, Labill. Pl. Nov. Holl., ii, t. 237, as *Mimosa Sophoræ* ; Lodd. Bot. Cab., t. 1,351, as *A. Sophoræ*.

The spreading Coast Wattle. One of the plants called " Boobyalla " (*Myoporum acuminatum* is another). By sea-shore and along banks of brackish or saltwater creeks.

The bark of the variety *Sophoræ* is used for tanning light skins in Queensland, but as it is comparatively weak in tannin it fetches but a low price. It is there called " Black Wattle." (Bailey.) Mr. W. Adam informs me that Sydney fishermen often tan their sails and nets with this bark, and are well pleased with it, the articles being pliable after use.

Var. *prostrata*, Moore and Betche. A spreading coast form certainly close to the preceding.

Var. *mucronata*, Bot. Mag., t. 2,747, as *A. mucronata* ; Wendl. Comm. Ac., t. 12, as *A. mucronata*.

Common in T., found also in V., and southern N.S.W.

Delegate, N.S.W., W.B.

Var. *Bylongensis*, R. T. Baker, in *Proc. Linn. Soc. N.S.W.* With phyllodes 15 inches long and ¼ inch broad. Bylong Creek, R.T.B.

Then we have a mountain form which forms an upright shrub about 6-8 feet high and of many stems. It flowers in midsummer, and is found on ridges not near water-courses, and has pale yellow flowers.

60. A. lunata, Sieb ; Bot. Reg., t. 1,352 ; Sweet Fl. Austr., t. 42 ; Lodd. Bot. Cab., t. 384 and t. 1,235, as *A. brevifolia.*

A glabrous shrub of several feet with angular branchlets, often glaucous. South Q., N.S.W., and Northern V.

" Without the fruit this species may readily be confounded with *A. prominens*; the phyllodia are, however, more coriaceous, with the veins less conspicuous, and the flowers in the heads usually rather fewer and larger."—(B.Fl. ii, 373.)

The specimen of the type (Sieber's Fl. Mixta, No. 600) in Nat. Herb., Syd., has the phyllodes usually ¾ inch long, and all under 1 inch. Width about ¼ inch.

Blue Mountains, also near Richmond, J.J.F. ; Wyalong, J.E.C. ; Back Creek, Tumberumba, R.H.C. No. 861, leaves nearly the size of those of var. *crassiuscula.*

Var. *crassiuscula*, Maiden and Betche.

Banks of the Nepean, R.Br. (*A. crassiuscula*, Benth. non Wendl., which is a W.A. sp.).

Also in T.

The specimens collected by Robert Brown, " banks of the Nepean River, 1802-4," have phyllodes commonly 3¼ inches long.

This is the form which Mr. Betche and I take as the type of our variety. In regard to other plants which Bentham (B.Fl. ii, 372) includes with this, *e.g.*, from Q. and T., we prefer to reserve our judgment.

107. A. Maideni, F.v.M., in N.S.W. Linn. Soc. Macleay Memorial Vol. (1893), with a figure. A mistake in the pod and seed has been corrected by R. T. Baker, *Proc. Linn. Soc. N.S.W.*, 1897, p. 232.

This is a tree of medium size (say 30 feet, with a diameter of 10 inches), found in the coast and coast mountain districts.

It goes under the name of " Sally," or " Hickory."

A specimen of bark from Lismore yielded 35·5 per cent. of extract and 15·75 per cent. of tannic acid. It belongs to the *melanoxylon, implexa, glaucescens* series as regards yield and value of bark.

It has been recorded from Milton, N.S.W., to southern Q. border.

" Sally Acacia," 30 feet, Milton, R.H.C. ; Stanwell Park, J.L.B. and J.H.C. ; George's River, near Sydney, J.H.C. ; Newcastle, R.H.C. ; Upper Gloucester, A.R. ; alluvial bank of Rawdon Stream, 30 feet high, 12 inches diameter, A.R. ; Moonan Flat, J.H.M., J.L.B. ; Jennings, J.H.M. and J.L.B. ; Woodburn and Ballina, W.B. ; Murwillumbah, R.A.C. ; Acacia Creek, Macpherson Range, W.D.

84. A. melanoxylon, R.Br. ; Bot. Mag., t. 1,659 and t. 3,358, as *A. brevipes* (rather doubtful) ; Lodd. Bot. Cab., t. 630 ; Wendl. Comm. Ac., t. 6 ; Brown For. Fl., t. 37 ; *Agric. Gaz.*, v (1894), p. 129.

The " BLACKWOOD," but also known as " Lightwood " and occasionally as " Black Sally," " Hickory," " Mudgerabah " of New England.

The bark of this highly valuable timber has usually gone to waste after the wood has been obtained from the logs. " The bark is, however,

rich in tannic acid, and ought not to be left unutilised, though no trees of this species should be sacrificed for the sake of their bark alone." (Mueller.) A sample of bark from Monga, near Braidwood, N.S.W., yielded the author 11·12 per cent. of tannic acid and 20·63 per cent. of extract. (*Proc. R.S., N.S.W.*, 1887, p. 31). It was apparently from an old tree, of a dirty brown colour, with whitish patches, giving the whole a silvery appearance ; has irregular vertical fissures, and this circumstance, with the small horizontal cracks, causes the outer bark to be readily detached in small flakes. The inner bark or bast is very strong, and would form an excellent coarse tying material for local use. I have not been able to get a more favourable specimen for tanning purposes.

All the States, except W.A. and Q. ; chiefly a highland and mountain species, but also on the coast.

Figured and fully described in my Forest Flora of N.S.W., Part xv, where a long list of localities is given. Common in coastal and coast mountainous N.S.W.

33. A. microcarpa, F.v.M. ; Ic. Austr. Ac.

A shrub up to 3 ft. 6 in. high ; spreading from 3 to 5 feet across. Found in the drier parts of S.A., V., and N.S.W.

Wyalong, R.H.C. ; Lachlan district, J.D. ; Darling River (? collector).

34. A. montana, Benth. ; Ic. Austr. Ac.

A shrub growing in bunches, 4 or 5 feet high.

Found in S.A., V., and N.S.W.

Temora, R.H.C. ; Tamworth, H.M.R.R. ; Angledool, Miss Newcomen.

115. A. Muelleriana, Maiden and Baker. *Proc. Linn. Soc. N.S.W.*, 1893, 515, t. xxv.

A handsome shrub or tree, 20 feet in height as seen. Allied to *A. decurrens*, but apparently so rare that it does not appear likely that it will be an important yielder of tan-bark.

Taloobie, Rylstone, R.T.B. ; Minore and Dubbo, J.L.B.

56. A. Murrayana, F.v.M.

One of the wattles called " Gundabloui."

Drier parts of S.A., Q., and N.S.W.

Byrock, G.V.M. ; Nyngan, A.R.S.

Bentham says (B.Fl. ii, 370), " Murray's specimen, a single one, is in flower only ; Mitchell's, of which we have several, are in fruit only ; it is possible, therefore, that they may not have been correctly matched, but they appear all to belong to one species, differing from *A. leptopetala* in little besides the long narrow phyllodia." It is eaten by stock, and is a species in regard to which we require additional information.

66. A. myrtifolia, Willd. ; Lodd. Bot. Cab., t. 772 ; Sweet Fl. Austr., t. 49 ; Sm. Bot. Nov. Holl., t. 15, as Mimosa.

A small shrub, found in every Australian State. The leaves of this dwarf wattle were, according to Wilhelmi, used to make a bitter drink, as a substitute for beer, in South Australia.

Following are some localities represented in the Nat. Herb., Syd. :— Jervis Bay, J.H.M. ; Nowra, W.B. ; Ophir, Orange, R.H.C. ; Port Macquarie, G.R.B. ; Boonoo Boonoo to Wallangarra, J.L.B.

44. A. nerifolia, A. Cunn.

The following analysis of the bark is given by the Queensland Commissioners, Colonial and Indian Exhibition, 1886 :—Tannin, 13·91 per cent. ; extract, 17·87 per cent. (*sic*). Common around Stanthorpe, Q. (F.M.B. and J.L.B.), where it is known locally as " Black Wattle," and used for tanning purposes.

The duramen is of a light-yellow colour, the rest is of a darker colour. It is prettily marked, close-grained, and tough.

N.S.W. and Q. On river banks and mountains in the coast districts from the Clyde River in southern N.S.W., to south Q.

Small trees of 8-20 feet. A very common wattle in New England. Usually growing on granite. Known variously as " Silver Wattle," " Bastard Yarran," or " Bastard Myall." A lovely species with its sheets or billows of bloom.

Howell and Inverell, J.H.M. and J.L.B. ; Warialda and Tamworth, " A tall shrub, almost arboreous," H.M.R.R. ; Drake, J.L.B. ; Jennings, J.H.M., J.L.B. ; Bolivia, J.V. ; Emmaville, J.L.B. ; Moonbi, F.R. ; Quirindi, W.McD., also Baradine, W.McD. ; Camboon and Murrumbo, Rylstone, R.T.B. ; Attunga, local Forest Ranger.

Going westerly we have it as " Bastard Yarran," Trowell Creek, 25 miles north of Nymagee,—a tree of 30 feet, R.H.C.

46. A. notabilis, F.v.M. ; Ic. Austr. Ac. ; J. Ednie Brown's Forest Flora of S.A.

Found in the drier parts of all the States, except T., V., and Q.

A tall handsome shrub, glabrous and often glaucous, the branchlets terete or nearly so.

In Nat. Herb., Syd., it is represented by a N.S.W. specimen—near Barrier Range (Dr. Beckler).

We want other specimens from this State.

27. A. obliqua, A. Cunn. ; Hook. Bot. Mag., t. 4041, as *A. rotundifolia ;* Paxt. Mag., xv, 123, as *A. rotundifolia ;* Ic. Austr. Ac.

A small species found in the drier parts of S.A., V., and N.S.W.

Corowa, S.P. ; low hills around Wagga, J.H.M. ; Wyalong to Barmedman, J.E.C., R.H.C.

48. A. obtusata, Sieb. ; B.Fl. ii, 366. Figured by R. T. Baker in *Proc. Linn. Soc., N.S.W.*, 1897, p. 694, t. xxiii.

A tall shrub, perhaps a form of *A. rubida*, A. Cunn., without the reddish tint of the phyllodia, which gave the name to the species (Bentham). Typical *obtusata* has quite obtuse leaves.

The type is Sieber's No. 441, from the Blue Mountains. A specimen in flower only is in Nat. Herb., Syd.

Barber's Creek, " an erect shrub of 3 or 4 feet, very showy when in flower," H.H.M., H.J.R. ; Wingello, J.L.B. ; Tarago, W.W.F. ; Monga, near Braidwood, " exceedingly rare, straggling shrub of 3 feet," W.B.

77. A. Oswaldi, F.v.M. ; Ic. Austr. Ac.

" Miljee," " Karagatta," " Whacka " of Mount Lyndhurst, S.A. blacks (M.K.). Often called " Umbrella bush," as it affords capital shade.

The bark of an oldish tree has been examined by the author, with the following result :—Tannic acid, 9·72 per cent. ; extract, 20·7 per cent. This much resembled the sample of *A. homalophylla* bark. (*Proc. R.S., N.S.W.*, 1887, p. 189.)

In all the States except T.; an inland desert species.

It has been sent to me as "Bean-bush," from Moulamein, "because it is prolific in pods."

A small umbrageous bush, hardly a tree. It is sparsely scattered over much of the western country. It is one of the wattles whose seeds were eaten by the blacks.

Balranald, G.S.M.G.; Moama (Watson); "Bean-bush," Moulamein, T.H.G.; Tibooburra, W.B.; Thackaringa, E.K.; "Goolia," Broken Hill, A.C.L.; native name, "Middert," Ivanhoe, *via* Hay. "Suckers very tough, and natives used to use them for the handles of their stone tomahawks. Sheep, not cattle, eat the leaves," H.H.B.; Weddin, J.H.M.; Nyngan, E.F.R.; Zara, *via* Hay, E.O.; Coolabah, R.W.P.; "Currawa Widgee" of the aborigines, Dandaloo, Bogan River, R.H.C.; Narromine, A.R.S.; Dubbo, E.B.; Tomingley to Peak Hill, J.H.M.; Wooyeo, G.S.H.; Brewarrina, J.H.M.; "Boree," Bourke, A.W.M.; plains near Baradine, W.F.; Narrabri, J.H.M.; Wee Waa, W.J.C.

93. A. oxycedrus, Sieb.; Bot. Mag., t. 2928; Paxt. Mag. Bot., vii, 151; Reichb. Ic. Exot., t. 120; Sweet Fl. Austr., t. 6.

A straggling, spreading, often bushy, very powerfully prickly tall shrub of 5-10 feet. N.S.W. and V.

Found in Sydney district, Blue Mountains, and as far north as Gosford and Tuggerah Lakes.

76. A. pendula, A. Cunn. "Myall," or "Weeping Myall"; also "Boree." Figured and fully described in my "Forest Flora of N.S.W.," Part xvi.

A sample of this bark from Yandarlo, Wilcannia, afforded the author (*Proc. R.S., N.S.W.*, 1888, p. 269) 3·25 per cent. of tannic acid, and 14·52 per cent. of extract. Height of tree, 10-12 feet; diameter, 4-6 inches; collected September, 1887; analysed August, 1888. A typical representative of the dry-country wattle-barks. It seems to consist of nothing but flakes and layers of fibre.

An inland and desert species of N.S.W. and Q.

Zara, Wanganella, *via* Hay (Miss E. and Ernest E. Officer); "Boree," 25-30 feet, diameter 9-12 inches; pendulous silver-leaved species, Barmedman and other stations in the Lachlan district," J.D.; "Boree—greatly used by natives for making weapons," Ivanhoe, *via* Hay, K.H.B.; Balranald, "Myall or Boree" (Forester Grant); Wagga, F.B.M.; Grenfell, "Myall or Boree," H.D.; Bourke, J.H.M.; Coolabah, J.H.M.; Nyngan, E.F.R., "in swampy ground" [N.B.—Oxley long since pointed out the fondness of the myall for these localities]; Willow Tree, near Mudgee, H.K.; Narrabri, J.H.M.; Warialda, J.H.M., J.L.B. in "damp land."

25. A. plagiophylla, F.v.M.; Ic. Austr. Ac. (*A. undulifolia*, A. Cunn., doubtful var. B.Fl. ii, 356).

A shrubby species described in Wing's *Southern Science Record* for July, 1882. Bailey agrees with Bentham that it is probably a variety of *A. undulifolia*.

Found in southern Q., and extending into N.S.W., according to Mueller, but I have no specimen in the Nat. Herb., Syd.

62. A. podalyriæfolia, A. Cunn. Figured in Hooker's Ic. Pl., t. 171, as *A. Fraseri.*, B.Fl. ii, 374.

Sometimes called "SILVER WATTLE."

The bark is used in tanning, giving a light colour to leather. The following analysis is given by the Queensland Commissioners, Colonial and Indian Exhibition, 1886 :—Tannin, 12·40 per cent. ; extract, 29·50 per cent. (Bailey).

Northern N.S.W. and Q.

I have no spontaneously-grown specimen in the Nat. Herb. It is very common in gardens, being a very ornamental species.

116. A. polybotrya, Benth. ; Ic. Austr. Ac.

A slender ornamental shrub Has usually 2-3 pairs pinnæ, leaflets 6-10 pairs.

Near Wellington, C.M.

Var. *foliolosa*, Benth. Softly pubescent ; pinnæ, 4-6 pairs, 2-3 inches long ; leaflets, 15-25 pairs, 3-6 lines, long and less obtuse.

At Warialda (J.H.M., J.L.B.) we have both forms.

67. A. pravifolia, F.v.M. (*A. sublanata*, Benth., var. *pravifolia*).

A small shrub with hairy pods. Q. and N.S.W.

Narrabri, J.H.M. It is also in the herbarium from Darling Downs, Q. (H.L.). These two localities will give a direction for searching for it, as it is a wattle which requires further investigation.

65. A. pravissima, F.v.M. ; Pl. Vict., ii, t. 24 ; F.v.M., Key Syst., Vict., Pl. ii, fig. 50.

This tall shrub has a thin, dark-grey to blackish bark, which yields a light-coloured powder, containing an unusually small proportion of fibre. But the expense of stripping it would bar its use practically, even if the percentage of tannic acid caused it to be a temptation to the stripper. A sample from Jindabyne, Snowy River, collected January, 1890, and analysed the following April, gave tannic acid 10·66 per cent., and extract 31·75 per cent. It was grown on granite soil, and was from shrubs 8 to 12 feet in height, and having a diameter of 1 to 3 inches.

Southern N.S.W., and V., and S.A. With us a highland species, found on the banks of the Snowy River.

Jindabyne, W.B. ; Quartzville to Neumenemang, W.F. ; Tumut, J.H.M. ; Tumut to Yarrangobilly Caves, E.B.

111. A. pruinosa, A. Cunn. ; *Proc. Linn. Soc.*, May, 1893, vol. vii, part 4, t. 13.

"BAGNALL WATTLE," of the Gosford District.

A sample obtained May, 1890, from Kincumber, near Gosford, N.S.W., from a largish tree, was barely ⅛ inch thick when green, and this, of course, would diminish on drying ; this specimen was analysed June, 1890, and was found to contain 24·25 per cent. of tannic acid, and 49·75 per cent. of extract, so that it is not a worthless species as is often supposed. It yields a thin greyish bark, containing little fibre ; it powders well, and might easily be mistaken for a bark of superior quality. The yield would not be large even for good-sized trees, as the bark is too thin.

This wattle is abundant in the neighbourhood of Gosford, N.S.W., where it attains a large size. It is, however, rather weak in tannic acid, and a mill may be seen falling into decay, because *after* the plant was erected the owner found that the bark would not pay to convey far. From superficial knowledge he might have jumped to the conclusion that the tree was *A. decurrens*, but the fact remains that a man was foolish enough to expend a fair amount of capital without the trouble to make sure he had suitable bark.

A very fine sample of this bark from Cooranbong, near Morrissett, Northern line, gave 23 per cent. of tannic acid, and 46·25 per cent. of extract. These two analyses may be assumed to fix the value of this bark.

N.S.W. and Q. Its southern limit appears to be the Brogo River, near Bega.

A glaucous medium-sized tree, up to say 30 feet. Flowers very sweet-scented.

Head of Lane Cove, Sydney, L.S.; near Wyong, J.L.B.; near Wallsend railway, Waratah, J.G.; foot of Mount Seaview, J.H.M.; Emmaville, J.L.B.

121. A. pubescens, R.Br.; Maund's Bot., vol. i, t. 48; Reichb. Ic. Pl., t. 73; Bot. Mag., t. 1263, as Mimosa; Vent. Jard. Malm., t. 21, as Mimosa.

A graceful species, allied to though smaller than *A. decurrens*. It is confined to N.S.W., and apparently to the coastal districts.

Mueller has a note: "*A. pubescens*, Shoalhaven River (Bäuerlen); height to 20 feet, stem only a few inches thick; seeds opaque, black, oval, turgid, about ¼ inch long; arillus whitish, cymbiform, pointed, nearly half as long as the seed." *Proc. Linn. Soc., N.S.W.*, 1890.

Left and right of the railway, Homebush to Parramatta; Belmore, A.J.H.; between Liverpool and Sydney, J.B.; Liverpool to Badgery's Creek, plenty at 1 mile out, near the Cemetery, and also at Cecil Park, J.H.M.

15. A. pugioniformis, Wendl.

A tall slender prickly shrub of coastal (chiefly) N.S.W. and Q.

La Perouse, Botany, &c., and Middle Harbour (Sydney); thence to Woodford (Blue Mountains), J.H.M. Its southern range is not known.

5. A. pumila, Maiden and Baker. Figured in *Proc. Linn. Soc., N.S.W.*, 1895, p. 385, t. xxviii.

A small wattle under a foot high. Described originally from specimens collected at Kenthurst, near Parramatta; it has since been received from Mount Tomah, Lawson (Blue Mountains), Kogarah (Botany Bay), and Middle Harbour (Port Jackson).

The following additional note was published in 1903:—Morriset and Richmond (J.L.B.). Since the publication of this species, many additional localities have been discovered, partly in the coast district from Port Hacking to Gosford, partly in the Blue Mountains as high up as Mount Tomah; and the additional material necessitates some modification of the description. The phyllodia are described as 6 lines long and 1 line

broad; it should read instead, "phyllodia from ½ to nearly 1½ inch long, 1 line broad in the short-leaved forms, considerably narrower in the long-leaved specimens" (Maiden and Betche).

The two above-named localities are habitats of the long-leaved form.

95. A. pycnostachya, F.v.M.

New England, near Tenterfield. Abundant at an elevation of from 1,000 to 1,500 feet (C.S.)

One of Charles Stuart's specimens is in the Nat. Herb., Syd.

Kelly's Gully, near Warialda, J.H.M. and J.L.B. Small trees with a somewhat fibrous stringy bark; in bud only, and therefore somewhat doubtful. Found also in southern Q. A species which requires further investigation.

13. A. rhigiophylla, F.v.M. See *Proc. Linn. Soc., N.S.W.*, April, 1902.

A small bushy shrub of 3 feet high, slightly glutinous-pubescent when young. Found in S.A. and N.S.W.

West Wyalong (R.H.C.). Previously only recorded from the desert on the Lower Murray River, towards Mount Barker Range in S.A.

14. A. rigens, A. Cunn.; Ic. Austr. Ac.

"NEALIE," or "Needle Bush."

A large shrub of 10 feet.

Bark from an old tree, from near Hay, N.S.W., yielded the author 6·26 per cent. of tannic acid and 19·05 per cent. of extract. (*Proc. R.S., N.S.W.*, 1887, p. 88.)

It consists of but little else than layers of fibre. A dry-country wattle: S.A., V., and N.S.W.

Wyalong, R.H.C.; Bygo run, Wagga district, Forester Taylor; Lachlan, J.D.; Harvey Range, J.H.M.; Angledool, Miss Newcomen. "Phyllodia sometimes flattened," Ivanhoe, *via* Hay, N.S.W.; Gawler Ranges, S.A., Dr. Sullivan.

I have received three kinds of "Nealie"—one *A. rigens*, one near *A. rigens*, and one with broader phyllodes, nearer *A. homalophylla* or *A. pendula*; but I cannot get ripe pods of the second and third kinds: I accordingly published the following note:—

The "Nealie," "Nelia," or "Nilyah." What is it?

In September, 1886, I received from the late K. H. Bennett, of Ivanhoe, *via* Hay, some bark, with the following label:—"No. 5, *Nealie, Acacia sp.*" He gave the following information:—"Small tree, 12 to 15 feet in height, timber exceedingly hard and tough and possessed of a very agreeable perfume; used by natives in manufacture of weapons, &c. Stock will not eat the leaves, even when in a starving condition. Very plentiful in some localities."

In 1887, the late Baron von Mueller received from Mrs. Holding, of "the Upper Darling River," specimens, with the following particulars:—"Nelia of the aborigines. Wood of Myall odour; boughs erect; dry ground."

In 1902, Acting Forester T. Miller, of Wilcannia, in official correspondence (117–02) referred to a wattle as Nelia.

In April, 1904, I received (through Mr. R. H. Cambage) from Mr. J. E. Carne, Assistant Government Geologist, some twigs labelled "Nilyah. Obtained from 14 miles south-west of White Cliffs. Said to be bushy, and inclined to follow damp courses."

Usually only bare leaves (phyllodes) have been sent, and, on one occasion, I received a few dead flowers. I have not failed to importune my correspondents, but from various circumstances they have been unable to send me twigs in flower, and also pods of the Nelia. Will anyone help?

ACACIA SALICINA.
COOBA OR NATIVE WILLOW.

The leaves are, as a rule, silvery white, like those of the Myall, but they are usually more erect and more rigid than those of the latter. Different botanists have labelled the plant *Acacia pendula* (which is of course the Weeping Myall) and *Acacia homalophylla* (the Yarran); but it is mere guess-work to name the Nelia in the absence of good flowers, and perhaps of pods also.

A few twigs with flowers or pods, or both, wrapped in a piece of newspaper will come safely to me for a penny or two; and if correspondents would give an idea of the districts in which the tree is found, they would increase my indebtedness to them."

("Forest Flora, N.S.W.," Part xvi, p. 130).

49. A. rubida, A. Cunn.; R. T. Baker in *Proc. Linn. Soc.*, Jun., 1898, vol. xxii, part 4, t. 24.

A tall shrub, often bushy, preferring damp situations. Has often a reddish cast of the leaves; hence the specific name.

Several of the phyllodineous *Acacias* long retain their pinnate seedling leaves, but in no species is this habit more prominent than in *A. rubida*, where the pinnate leaves at the base of the stem seem to be scarcely ever absent, even in full-grown plants.

Found in N.S.W. and southern Q.

Tumut, J.H.M., J.L.B.; Cooma, J.H.M.; Michelago, E.B.; "Black Wattle," Queanbeyan, Forester Harris; Wingello, J.L.B.; Bowral to Bullio, J.H.M., R.H.C.; Thornleigh, Sydney, W.W.F.; Woodford, Faulconbridge, J.H.M.; Walcha, J.F.C.; Stanthorpe, Q., J.L.B.

53. A. salicina, Lindl.

"COOBA," or "KOUBAH." "NATIVE WILLOW." "MOTHERUMBA." (See also *A. Cunninghamii*).

Following is a condensed account of the analyses of two specimens of this bark, recorded by me, in *Proc. R.S., N.S.W.*, 1888, 268:—

a. Tarella, Wilcannia.—Height, 20-25 feet; diameter, 12-18 inches. Collected August, 1887; analysed August, 1888. A coarse, flaky bark, not so fibrous, more compact, and altogether more promising looking than most of the dry-country barks. Average thickness, up to ¾ inch; tannic acid, 13·21 per cent.; extract, 35·28 per cent.

b. Momba, Wilcannia.—Height, 30-40 feet; diameter, 12-18 inches. Collected August, 1887; analysed September, 1888. Not flaky on the outside like No. 1, but a harder, bonier bark; more rugged, but obviously a promising bark. Thickness, up to 1 inch; tannic acid, 13·51 per cent.; extract, 33·1 per cent.

A sample from the Lachlan River, N.S.W., which had then been in the Technological Museum five years, is a good specimen of this bark, being fairly smooth, close, compact, and containing comparatively little fibre. It was analysed May, 1890, and found to contain 15·1 per cent. of tannic acid, and 32·75 per cent. of extract.

This species is undoubtedly worthy of conservation, and even culture, in the dry interior when it is found, particularly as the barks there are usually so poor in tannic acid. The blacks are aware of the value of this tan-bark, as they use it for tanning wallaby and other skins.

This is one of the species whose leaves are used to burn for the ash which the aborigines mix with the Pituri, their masticatory. They also eat the seeds.

An interior species, found in all the States except Tasmania. Habitat, chiefly on the banks of creeks and watercourses.

It attains a diameter of 2 feet, and is, therefore, one of the largest of our wattles.

Following are some additional aboriginal names (S.A.) :—" Muntharra," Lake Eyre, B.S. ; " Balkura," Mount Lyndhurst, M.K. ; " Wirrha," Cooper's Creek, near Lake Eyre, A.W.H.

Some N.S.W. localities in Nat. Herb., Syd., are—Moulamein, T.G. ; " attains in favourable situations a height of 35-40 feet, and is the largest and handsomest of our Acacias ; is usually regarded as an indication of water at a shallow depth ; wood remarkably light and tough," K.H.B., Ivanhoe, *via* Hay ; Paroo, E.B. ; Bourke, W.S.C. ; Brewarrina, J.L.B. ; Marra Creek, Coolabah, R.W.C. ; " Eumong," Coolabah, J.L B. ; Scone and Singleton, J.H.M. ; Denman, J.H.M., J.L.B ; Attunga, R.H.C.

18. A. scirpifolia, Meissn. ; Ic. Austr. Ac.

A " broom-leaved " species, recorded in B. Fl., from W.A., and in Mueller's Census, from S.A. and N.S.W. It doubtless occurs beyond the Darling. I have no specimen from N.S.W., and trust it may be searched for.

80. A. sclerophylla, Lindl. ; Dietr. Fl. Univ., N. Ser., t. 85 (incorrect as to nervation, Bentham).

Found in the drier parts of S.A., V., and N.S.W.

Mr. Walter Gill says it is known as, " Wire-weed " in S.A., and that it is " wiry enough often to turn axes when men are clearing scrub."

Upper Darling River, G.D.

39. A. sentis, F.v.M. ; Ic. Austr. Ac.

" PRICKLY ACACIA " or " THORNY WATTLE." " Kalyoo " (Mount Lyndhurst aborigines), M.K.; blacks eat the seed, " Kalyoo-thandra." It is one of the wattles called " Gundabloui."

A specimen of a dirty-grey scaly bark $\frac{3}{8}$ of an inch thick, from Ivanhoe, N.S.W., yielded me 18·02 per cent. of extract, and tannic acid 6·32 per cent: (*Proc. R.S., N.S.W.*, 1887, p. 29.)

A second sample from Cobham Lake, Milparinka, N.S.W., was analysed by me August, 1888. (*Proc. R.S., N.S.W.*, 1888, 268.) Tree, height 15 to 20 feet, diameter 4 to 6 inches, collected August, 1887. It yielded tannic acid 10·26 per cent., extract 33·82 per cent. This bark would scarcely be taken for the product of a dry-country wattle. It is from a younger tree to that already described, and is almost perfectly smooth and of a light-brown colour. The collector reports, " When fresh it is of a beautiful bright-green colour, much like the bark of *A. decurrens*. I have found it easier to strip than any other bark I have stripped yet out west." It is very compact. Average thickness, $\frac{1}{8}$ inch.

A small tree ; upright rigid growth ; thorns on branches.

Good fodder, especially for camels. Sheep also fond of pods in W.A.

An inland, desert species. In all States except T.

" Yourieowie," Broken Hill, Forest Reserve 39,293, A.C.L. ; Tibooburra, " Considered to be a sure indication of underground water." W.B. ; Brewarrina, J.L.B. ; Ivanhoe, *via* Hay, K.H.B. " Only found on the plains and near the river."

8. A. siculiformis, A. Cunn. The normal form not figured in the following works, but a var. which gives a very good idea of the sp. :— Var. *bossioides*, Dietr. Fl. Univ., N. Ser., t. 82, as *A. Stuartiana* ; Hook. Fl. Tasm., i, t. 49, as *A. Stuartiana*.

A tallish shrub, merely. The bark not to be distinguished from that of *A. pravissima*. I analysed (April, 1890) a sample of bark from Jindabyne, Snowy River, N.S.W., collected January, 1890; height, 6 to 10 feet; diameter, 1 to 4 inches; grown on granite soil. It contains 7·87 per cent. of tannic acid, and yields 31·85 per cent. of extract.

Found in the mountains and high table-lands of N.S.W., V., and T.

Mount Kosciusko, J.H.M.; Yarrangobilly Caves, E.B.; Tumberumba, R.H.C.; Cooma to Nimitybelle, J.H.M.; Tumut, J.H.M. and J.L.B.; Tarago, W.W.F.; Apsley Falls, New England, J.F.C., W.F., E.C.

112. A. spectabilis, A. Cunn.; Bot. Reg., 1843, t. 46; Engler Nat. Pflanzen, iii, 3, p. 109, fig. 64.

Following is Allan Cunningham's account of its discovery, taken from his MS. Journal, under date 29th April, 1817:—"A beautiful species of Acacia—an arbuscula, with leaves bipinnate, partial ones 3-pair, proper 4-6 pairs, leaflets ovate, flowers on elongated spikes. The whole plant has a glaucous hue. In consequence of its beautiful appearance I have called it *A. spectabilis*. W. of Bathurst."

Reminds one of the common *discolor* a good deal, but flowers are bright yellow, and leaflets not paler on the underside.

Bentham's var. (?) *Stuartii* (B.Fl. ii, 413), "Leaflets ten to fifteen pairs and rather narrower, but glands as in *A. spectabilis*, New England, *C. Stuart;* between Byron Plains and the Macintyre River, *Leichhardt*," does not appear to be a strong variety.

The species is confined to N.S.W. and Q.

Tomingley to Peak Hill, J.H.M.; Harvey Range, E.B.; Dubbo and Minore, J.H.M., J.L.B.; near Mudgee, F.F.; Gulgong, J.L.B., J.H.M.; Denman, A.R.; Warrah, small leaflets, J.G.; Tingha, R.H.C.; Howell, J.H.M., J.L.B.; Emmaville, J.L.B.; "Weak-growing plant 4-6 feet high, 2 inches diameter," Mount Dangar, Gungal, J.L.B.; Coolootai Creek, H.M.R.R.; Wallangarra, J.L.B. A remarkable specimen where the upper leaves are reduced to phyllodia. (Phyllodineous Acacias with pinnate leaves are, of course, common enough.)

2. A. spinescens, Benth.; Ic. Austr. Ac.

Specific gravity of the wood, 1·010. (*Report, Victorian Exhibition*, 1861.)

A prickly shrub from the drier parts of S.A., V., and N.S.W.

I have not received it from N.S.W.

79. A. stenophylla, A. Cunn., Ic. Austr. Ac.

"NATIVE WILLOW" or "EUMONG." [See also *A. salicina*.]

A sample of bark from this wattle, obtained from Yantara, Milparinka, N.S.W., gave the author (*Proc. R.S., N.S.W.*, 1888, p. 270) 9·49 per cent. of tannic acid, and 24·46 per cent. of extract. Height of tree, 15 to 20 feet; diameter, 6 to 12 inches; collected November, 1887; analysed September, 1888. A rugged-looking, coarsely-fissured bark, possessing the characteristic appearance of those of the dry-country wattles. Average thickness, $\frac{5}{8}$ inch.

A dry-country species; found in all the States except T.

A riparian Acacia of weeping habit. In the old days the timber was much sought after for swing-gates.

"Cooba," edible, Moulamein, T.G.; Zara, *via* Hay, E.O.; "Cuba," Wooyeo, Lake Cudgellico, G.S.H.; "River Cooba," Euabalong, R.H.C.;

Nyngan, up to 30 feet, J.H.M., J.L.B.; "Eumong" or "Umong," "girth to 7 feet," Nyngan E.F.R.; Coolabah, J.L.B., J.H.M., R.W.P.; Brewarrina, J.L.B.; Yantara Lake, W.B.

87. A. stricta, Willd.; Andr. Bot. Rep., t. 53, as Mimosa; Bot. Mag., t. 1,121; as Mimosa, Lodd., Bot. Cab., t. 99 (a doubtful narrow-leaved form, Bentham); Reichb. Ic. Pl., t. 90.

"Berry-yung" is the aboriginal name at the Coranderrk Station (Victoria).

An erect slender species, usually quite small.

T., V., and N.S.W.

Mount Dromedary (Brewer ?); Cambewarra (Bacuerlen); height up to 20 feet, Mueller in *Proc. Linn. Soc., N.S.W.*, 1890.

Gosford, J.S.; Eden to Pambula, J.H.M.; Bethungra, C.D.; Wingello, J.H.M., J.L.B.; Bowral to Wombeyan, J.H.M. and R.H.C.; Bargo Brush, J.H.M.; Blue Mountains, J.H.M.; Crawford River, E.C.

54. A. suaveolens, Willd.; Jacq. Hort. Schoenbr., iii, t. 391, as *Mimosa angustifolia;* Journ. Hist. Nat., i, t. 5, as *Mimosa obliqua;* Labill., Pl. Nov. Holl., ii, t. 236, as Mimosa; Lodd. Bot. Cab., t. 730 and 763, the latter as *A. angustifolia;* Reichb. Ic. Pl., t. 46; Banks and Sol., Illustr., i, t. 83.

A slender small shrub, with angular branchlets. Has white to cream-coloured, sweet-scented flowers, and is found in all the States except T. A very common species except in the driest parts.

68. A. sublanata, Benth. (see *A. pravifolia*).

Cobar, N.S.W., J.M.C. Found also in S.A.

Has smooth (shining) valves of pods; a small shrub. The Cobar specimen was so named by Mueller, but it had better remain doubtful until we get flowers. Allied to the better-known *A. amblygona.*

78. A. subporosa, F.v.M. (*supporosa* in Muell., Fragm. iv, 5) Ic. Austr. Ac.

"RIVER WATTLE."

A sample of bark from a Victorian locality yielded Baron von Mueller 6·6 per cent. of tannic acid, and 1·2 per cent. of gallic acid. (*Cat. Technological Museum, Melbourne.*)

A sample from Colombo, Candelo, N.S.W., was collected in June, 1889, and analysed by me, April, 1890. It is a smooth, thin, fibrous, light-coloured bark, strongly resembling that of *A. longifolia.* It is from trees 20 to 30 feet in height, and with diameters of 6 to 15 inches. It was grown in granite country. My analysis gave 6·6 per cent. of tannic acid, and 22·55 per cent. of extract, peculiarly coincident with the determination already given.

Found in coast districts in N.S.W. and V., on the banks of creeks and rivers. Its most northern extension for N.S.W. appears to be the Shoalhaven River.

There is a var. *linearis,* Benth. "Tall shrub, phyllodia narrow-linear, flower-heads much smaller, with 12 to 20 smaller flowers; with the broad-leaved variety." (B.Fl. ii, 382.)

Most of the N.S.W. specimens in the Nat. Herb., Syd., are var. *linearis,* and I would like additional N.S.W. specimens of the normal form. Var. *linearis* is sometimes confused with *A. leprosa,* var. *tenuifolia.* The

phyllodes are, however, usually 3 inches long, decidedly linear, rarely, if ever, falcate. Two or more side-veins often present. Buds commonly viscid.

96. A. subtilinervis, F.v.M.

An erect shrub, allied to *A. longifolia*, but requiring further investigation. It is confined to the south-east of the State, so far as known. I am in doubt as to whether it really occurs in V. as stated (B. Fl.,ii, 396), since the locality given, "Granite hills about Mount Imlay," may be a N.S.W. one. Other localities in this herbarium are Yowaka, *via* Pambula, H.W.S. The pods (stated to be unknown, B.Fl. ii, 396) may be described as "pods nearly straight, flattened, glabrous, linear, tapering to both ends, $1\frac{1}{4}$ to $1\frac{1}{3}$ of an inch long and about $\frac{1}{7}$ of an inch broad, occasionally narrower between the seeds. Seeds rarely above 3 in the pod, placed longitudinally; funicle not seen." The above description was drawn up from a few empty valves of the pods picked up under a bush at Yowaka, H.W.S.; Clyde Mountain, W.B.

57. A. subulata, Bonpl.; Jard. Malm., t. 45; *Proc. Linn. Soc.*, March, 1894, vol. viii, part 2, p. 9.

A tall glabrous shrub of 10 feet, with narrow-linear leaves. It is confined to N.S.W., as far as known.

It would appear that this species and *A. calamifolia* run into each other, although they are in different sections.

Dubbo, E.B.; Minore, J.L.B.; Murrumbo, R.T.B.; Upper Hunter, near the Baerami or James Creek, and near the Widden Creek, L.S.; Narrabri, J.H.M.; Warialda, H.M.R.R., J.H.M., J.L.B.

9. A. tetragonophylla, F.v.M., Ic. Austr. Ac.

"DEAD FINISH." Aboriginal name, Mount Lyndhurst, S.A., "Barrarrecka" (M.K.); "Alkitjer" of those of Lake Eyre (B.S.).

A sample of this bark from Tarella, Wilcannia, N.S.W., from a tree whose height was 10 to 12 feet, and diameter 6 to 8 inches, was examined by the writer (*Proc. R.S., N.S.W.*, 1888, p. 267), and gave 5.59 per cent. of tannic acid, and 14.96 per cent. of extract. It was collected August, 1887, and analysed August, 1888. This is one of the usual dry-country wattle-barks, consisting almost entirely of bundles of fibre, even the hoary outside bark being more or less readily separable into long ribbons.

A tall shrub or small tree, with needle-shaped prickly leaves.

The wood is too small for anything except whip-handles. It grows very crooked as a rule. It is very hard, heavy, tough, and close-grained. Its prevailing colour is reddish-brown, and it has pinkish stripes. It is well adapted for small turnery and cabinet-work, but it is hard to work. When fresh it smells like violets.

A western and desert species occurring in N.S.W., V., S.A., and Q.; not found in the coast districts, nor, I believe, in the mountain ranges. Its chief habitat is the country west of the Darling.

White Cliffs, E.P.O'R.; Bourke, J.H.M.

6. A. trinervata, Sieb.

A tall slender shrub, with prickly leaves. I have not seen it higher than 12 feet (Faulconbridge).

Apparently confined to the Blue Mountains, N.S.W., and its spurs.

Kurrajong Heights, R.H.C.; Faulconbridge, Springwood, and Valley Heights, J.H.M. and R.H.C.

Var. *angustifolia*, Benth. "Phyllodia very narrow, with the two or three nerves scarcely prominent, but shorter than *A. elongata*, and always pungent. Blue Mountains."

For a note on this supposed form of *A. trinervata* see p. 58, and also *A. elongata*, p. 73.

Var. *brevifolia*, Benth. "Phyllodia ½ to ¾ inch long. *A. genistifolia*, Link." (B.Fl. ii, 325) I have not seen.

70. A. trineura, F.v.M.

A strongly-scented tallish bushy shrub, found in the drier parts of V., and recently in N.S.W.

Temora, R.H.C.; Wyalong, J.L.B.

92. A. triptera, Benth.; Ic. Austr. Ac.

"KANGAROO WATTLE."

Forms a dense, impenetrable shrub, very showy when in flower. Found in the drier parts of N.S.W. and Q., also in north-east V.

"Kangaroo Acacia," from the Bygo Run; 4 feet or 5 feet high; spreading habit; very scarce; grows in poor soil; a handsome shrub. "Not seen by me on any other run in either the Lachlan, Riverina, or Murrumbidgee districts. Would make a handsome hedge. About 10 miles out, on Stewart's run there is a patch or clump of them about 500 in all." F.R.T., Forester, Wagga Wagga (1888); Dubbo, J.L.B.; Cobar, J.M.C.; Gungal, Merriwa, wide-spreading flat plant, J.L.B.; parish Baldwin, county Hardinge, J.F.C.; Howell, J.H.M., J.L.B.

Var. *Lyndoni*, R. T. Baker, from Coonabarabran. Figured by R. T. Baker, *Proc. Linn. Soc., N.S.W.*, 1897, p. 696, t. xxv. It is a variable species; there are other forms, but it is difficult to define them.

31. A. undulifolia, A. Cunn.; Bot. Mag., t. 3,394; Lodd. Bot. Cab., t. 1,544; Lem. Jard. Fleur., t. 282; Hook. Ic. Pl., t. 166, as *A. setigera*; Lindl. Bot. Reg., t. 1,332, as *A. uncinata*.

A spreading, often straggling bushy species, very ornamental when in flower. Found in Q. and N.S.W.

Yass, W.W.F.; The Peaks, Burragorang, R.H.C.; Mullion Creek, near Orange, 3 or 4 feet, R.H.C.; Warrumbungle Ranges, E.B., W.F.; Quirindi, W.McD.; Bylong Creek, Goulburn River, also Mount Vincent, R.T.B.; Merriwa to Collaroy, plentiful on the sandstone, J.H.M., J.L.B.; Murrurundi, J.H.M., J.L.B.; wide, weak spreading habit, 6 feet, Gungal, J.L.B.; Inverell to Tingha, R.H.C., 2 to 2 ft. 6 in.

Var. *sertiformis*, Benth., Hook. Ic. Pl., t. 159, as *A. sertiformis*. "More glabrous, with larger phyllodia, not contracted at the base, Liverpool Plains" (B.Fl. ii, 356).

Var. *dysophylla*, Benth., "Softly villous, phyllodia large; pine ridge near Croker's Range" (B.Fl. ii, 356).

Var. *humilis*, Benth., "Diffuse and low, glabrous; phyllodia not above three or four lines long, very oblique and often recurved, nearly as broad as long. North-west interior of N.S.W.; also Brisbane" (B.Fl. ii, 356).

Var. *pubescens*, Maiden and Betche. *Proc. Linn. Soc., N.S.W.*, xix, 457. George's River, near Campbelltown (T.V.A.).

35. A. verniciflua, A. Cunn.; Bot. Mag., t. 3,266 and 3,279, the latter as *A. graveolens;* Lodd. Bot. Cab., t. 1,460, as *A. graveolens*, t. 1,246, as *A. virgata.* "Stinkwood Bush."

This small tree (height, 20 to 25 feet, with a diameter 2 to 5 inches), exudes a sticky substance with an aromatic odour from the leaves*, hence the specific name. The appearance of the bark reminds one irresistibly of cascarilla.

A case of supposed poisoning of cattle from eating this plant, in Tasmania, is recorded in *Journ. Tas. Council of Agric.*, September, 1892.

It is full of fibre, and of no use to the tanner. A specimen collected in April, 1889, on the Delegate River, N.S.W., in granite country, was analysed by me the following April, and found to yield only 3.16 per cent. of tannic acid, and 22.35 per cent. of extract.

Found in all the States except W.A. and Q. In the south-east it does not extend further north than the Bombala district; out west it was found both by Cunningham and by Mitchell.

Delegate River, W.B.; Yass, J.M.C.; Rocky Hills, Cox's River (J.H.M. and R.H.C.). This is the type locality, and the plants are slender shrubs. Doubtless the plant referred to by Cunningham in his MS. Journal, p. 8, as "*Acacia vernix.*" Bumberry, near Molong, J.H.M.; Rylstone, R.T.B.; Mount McDonald, on granite, R.H.C.

Var. *latifolia*, Benth.; Dietr. Fl. Univers. N. Ser., t. 83, as *A. exudans.* "Phyllodia shorter and broader," B.Fl. ii, 358. (*A. exudans*, Lindl.), "the leaves being covered with a clammy exudation resembling honeydew." (Lindley in Mitchell's *Three Expeditions*, &c., 214.)

The type of *A. exudans* came from "Plains of the Glenelg" (V.).

94. A. verticillata, Willd.; Lodd. Bot. Cab., t. 535; Bot. Mag., t. 110 as Mimosa; Vent. Jard. Malm., t. 63 as Mimosa; Engler, Nat. Pflanzenfam., iii, 3, p. 108, fig. 63.

Commonly called "Prickly Moses" (a corruption of Mimosa) in the Southern States.

A tall dense prickly shrub often forming an impenetrable mass. Flourishes in damp situations, though not confined to them. Found in all the States except W.A. and Q.

Var. *latifolia*, Benth. "Phyllodia lanceolate or oblong" (B.Fl. ii, 334); Bot. Mag., t. 3,195 as *A. ruscifolia.* Lindl. Bot. Reg. 1,846, t. 67 as *A. maesta.*

Var. *ovoidea*, Benth. "Phyllodia slender. Spikes very short, sometimes reduced to small, ovoid-globular heads. Flowers small, calyx lobes narrow," (B.Fl. ii, 335).

Dietr.Fl. Univ. N. Ser., t. 8, as *A. ovoidea*; Hook. Fl. Tasm., i, 20, as *A. ovoidea.*

This species is especially common in T. and V. I have no N.S.W. specimen; it is inserted as a N.S.W. plant on Mueller's authority. I would expect to find it on the Monaro.

63. A. vestita, Ker.; Bot. Reg., t. 698.

Bark from near Bombala, N.S.W., yielded 50·82 per cent. of extract, and 27·96 per cent. of tannic acid (*Proc. R.S., N.S.W.*, 1887, p. 89).

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* The original description of this species in Barron Field's *New South Wales*, notes 'ramis junioribus viscidis."

It grew on limestone country, and was from a tree 18 inches in diameter. Analysis of a second sample from the same district gave an even better result, viz. :—33·2 per cent. of tannic acid, and 64·51 per cent. of extract. This is very similar in appearance to the bark of *A. decurrens*, for which it might be substituted without detriment. It is a most useful bark, but, unfortunately not of wide distribution. It is at the same time one of the most beautiful of wattles, and therefore I feel the responsibility of pointing it out as a fit subject for the bark-stripper.

A very handsome species; N.S.W. and northern V.

Quiedong, Bombala, rare in district, J.H.M.,; Colombo, Candelo, J.S.A.; Bathurst, A.O.; Drooping wattle 10-12 feet, Ophir, Orange, R.H.C.; Lewis Ponds, R.H.C.; Molong, J.H.M.; Wellington (Nancarrow).

I have not collected it in the locality (Blue Mountains) mentioned in B.Fl. ii, 375.

82. A. viscidula, A. Cunn.

A shrub, more or less pubescent and resinous, viscid. Found in N.S.W. and Q.

Five or 6 feet. A spreading shrub on granite. Tingha, R.H.C.; New England, C.S.; Tenterfield (a shrub of 6-8 feet, with long narrow phyllodes, on sides of hills), E.B., J.H.M., J.L.B.; Grafton to Dalmorton, J.H.M., J.L.B.

Var. *angustifolia*, Benth. "Phyllodia about ¾ line broad. Flower-heads smaller" (B.Fl. ii, 387). No locality given.

24. A. vomeriformis, A. Cunn.; Dietr. Fl. Univ. N. Ser., t. 82; Hook. Fl. Tasm. i., t. 18, as *A. Gunnii.*

Specimens from Sawpit Creek, Mount Kosciusko, do not show the seeds mottled as figured in Hooker, *Fl. Tas.* (i, t. 18), nor is the mottling present in a Tasmanian specimen we have examined.

This is A. Cunn's. "Acacia allied to *biflora*. Hills near M. Q. Range." (Herb. Kew.)

A dwarf prickly shrub found in all the States except W.A. and Q.

Cooma, W.W.F.; Sergeant's Point, W.B.; Monga, Braidwood, W.B.; Tarago, A.G.; Barber's Creek, H.J.R.; Berrima, J.H.M.; Wombeyan Caves, Taralga, J.H.M., R.H.C.; Clarence Siding, J.H.M., J.L.B.; Portland, Mudgee line, J. Geddes; Sunny Corner, J.L.B.; Rylstone, R.T.B.; Apsley Falls, New England, W.F. and E.C.; Howell, Inverell, J.L.B. and J.H.M.

VERNACULAR NAMES.

A good many of our wattles have sharp, pointed leaves (phyllodes), and so they often go by such names as "Prickly Wattle," "Needle bush," and so on.

Some wattles appear to have obtained exclusive possession of certain local names; amongst these are—the "Mulga" (*A. aneura*), the "Currawong" or "Spear-wood" (*A. doratoxylon*), the "Cooba" or "Native Willow" (*A. salicina*), (vernacular names perhaps shared with *A. stenophylla*) the "Gidgee" (*A. Cambagei*), the "Miljee" or "Umbrella Bush" (*A. Oswaldi*), the "Kangaroo Thorn" (*A. armata*), the "Green Wattle" (*A. decurrens*, var. *mollis*).

ACACIA VESTITA.

UNIV

Other wattles have *almost* appropriated certain names to themselves. Amongst these are *A. dealbata*, the "Silver Wattle," which occasionally shares this name with *A. podalyriæfolia*; the "Dead finish," usually appropriated by *A. tetragonophylla*; the "Myall" or "Boree," usually assigned to *A. pendula*, but also shared by *A. glaucescens*; the "Mountain Hickory" (*A. penninervis*), a term also applied to *A. elata*. The "Bastard Myall" is *A. Cunninghamii*, but the name is also occasionally given to *A. melanoxylon*. So also is the name "Sally" (corruption of Sallow,—a Willow) taken by *A. longifolia*, var. *floribunda*.

But many of the common names given to wattles are applied to more than one or two. The principal instances are the "Black Wattle," a name applied to *A. decurrens*, *binervata*, *Cunninghamii*, *hakeoides*, *neriifolia*, and others. The name "Hickory" is applied to *A. binervata*, *penninervis*, *doratoxylon*, *falcata*, *implexa*, *longifolia*, *melanoxylon*, and others.

It will thus readily be seen that it would scarcely be sufficient to refer to a "Black Wattle" in correspondence without stating the locality in which the name is in use; from our knowledge of what wattles grow in a certain district we might be able to fix the particular wattle, but naming plants in this way often resolves itself into guess-work, and if one wants a wattle named it is always best to send a flower-bearing twig, and, if possible, some pods and seeds.

References to the vernacular names will readily be ascertained from the Index.

APPENDIX.

Since this work was set up in page form I have received from the Director, Royal Gardens, Kew, certain type specimens, which necessitate the recasting of my remarks as to the normal *A. penninervis* and certain varieties at p. 49.

Acacia penninervis, Sieb. (his No. 458), is identical in every respect with *A. impressa*, A. Cunn., and Mr. R. T. Baker's var. *lanceolata*, which must, therefore, fall.

A. astringens, A. Cunn., comes from the Blue Mountains. It is the type of *A. penninervis*, Sieb., var. *falciformis*, Benth. It is the common "Tanning or Black Wattle," or "Mountain Hickory," and is, therefore, not the type of *A. penninervis*, Sieb., which, at p. 49, I had thought might be the case.

In the plate of *A. penninervis*, Sieb., facing p. 48, the twig is the type, as likewise the medium-sized phyllode at the right-hand top corner. The very narrow phyllode is var. *angustifolia*. The very large phyllode is var. *falciformis*.

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